

INTRACULTURAL VARIATION IN BLOOD PRESSURE IN BEIRA,
MOZAMBIQUE

By

NANETTE LOUISE BARKEY

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2002

ACKNOWLEDGMENTS

Many people in Mozambique and the U.S. helped to make this dissertation possible. At Eduardo Mondlane University I owe a debt of gratitude to Drs. Paula, Ana, Teresa, Rafael, Mate, Maria Jose, Zonjo, and Tino. My anthropology students in 2000 and 2001 taught me about life in Mozambique and medical anthropology, especially Emidio, Maria Ivonne, Fransisca, Katia, Aurelio, and Salvador. Also in Maputo, I want to thank Harriet McGuire who made so many good things happen for me, as did Esmerelda and Joao, Steve and Michelle, Jill and Richard, Karen, Chad, and Annie. Olanda Bata and Marcos Freire have been friends since Gainesville, and their continued friendship in Mozambique is a joy.

In Beira there I had more friends and colleagues. At the Catholic University: Father Mike, Father Elias, Dawndra, Rose, Greg, and Silvestre were all helpful. At the UP: Dr. Uacane, and at ARPAC: Dr. Chuva and Joao Joaquim were supportive. At the Provincial Ministry of Health: Drs. Amos, Cristina, Selma, and Mussa participated. Bizeque, Aguida, and Fransisco were outstanding research assistants, and I thank them. We had good friends to keep us company in Beira, including Janet, Nicky, Maureen, Christy, Bill and Tara. A million thanks go to Dona Fatima and Dona Emelia for everything they did.

At the University of Florida, I owe a debt of gratitude to my colleagues in the Center for African Studies and the Anthropology Department, especially Peter, Parakh, Andy, Elli, Paige, George, Isaac, Dave, Hank, Ken, Rachel, and Lance. Beth was the kind

of friend and academic colleague we all dream of having. She helped in ways too numerous to list. I owe Russ and Carole my unending gratitude for all of their help and support over these five years. From Dr. Chege I learned about Africa, teaching, research, and writing. I thank him and Annie for all their support, and for having encouraged me to visit Mozambique. Jim Stansbury and Leslie Lieberman served as outstanding committee members and supporters. Hunt and Jeanne Davis always provided a place to live when I was in need, and made sure I was working hard. Marvin Harris shared with me his passion for Mozambique before he passed away.

Kathy and Bill are always there for advice and encouragement. Jeannine has been a great source of support and a friend since we met. To my parents and my husband, I owe the largest debt. Their support helped me make it through all the tough spots and their love has been wrapped around me at all times.

TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGMENTS.....	ii
ABSTRACT.....	vi
CHAPTER	
1 INTRODUCTION	1
Culture Change and Intracultural Variation	2
Cultural Consensus Modeling to Study Variation	6
The Effects of Culture Change on Health	9
High Blood Pressure in Africa: An Overview	11
The Research Project.....	12
2 SETTING.....	16
Mozambique.....	16
The City of Beira.....	28
Ponta Gea	38
3 REVIEW OF THE LITERATURE	44
Introduction	44
An Overview of Hypertension in Africa	45
Defining and Measuring Psychosocial Stress	63
Cultural Consensus Modeling to Study Psychosocial Stress and Social Support.....	74
Summary	84
4 HYPOTHESES.....	86
Introduction	86
Phase One Hypotheses	88
Phase Two Hypotheses.....	89
5 PHASE ONE: ETHNOGRAPHY	90
Consensus Modeling: Reprise	90
Methods Used in Phase One	91
Freelist and Rankings Findings	102

Discussion of the Findings	110
Preparing the Questionnaire for Phase Two.....	122
6 PHASE TWO:MODEL TESTING.....	126
Phase Two: Survey Methods.....	126
Presentation of Preliminary Results	142
Survey Results.....	144
7 CONCLUSION.....	177
APPENDIX	
A LEGEND AND MAP OF PONTA GEA	187
B LIFESTYLE ITEMS FROM TWENTY TWO FREELISTS.....	189
C QUESTIONNAIRE IN ENGLISH.....	192
D QUESTIONNAIRE IN PORTUGUESE.....	197
E ORAL CONSENT – INSTITUTIONAL REVIEW BOARD	202
F TABLE OF EDUCATIONAL CATEGORIES FROM THE MOZAMBIKAN CENSUS.....	209
REFERENCES	210
BIOGRAPHICAL SKETCH	225

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

INTRACULTURAL VARIATION IN BLOOD PRESSURE IN BEIRA,
MOZAMBIQUE

By

Nanette Louise Barkey

December 2002

Chair: H. Russell Bernard
Major Department: Anthropology

The research described in this dissertation evaluates the role of psychosocial stress and social support in the development of high blood pressure in a neighborhood in Beira, Mozambique. It uses consensus modeling to develop culture-specific models of lifestyle and social support, and tests whether consonance with these models is predictive of high blood pressure or buffers against it. Blood pressure was measured as an expression of psychosocial stress, as well as an indicator of a chronic disease.

Mozambique has been experiencing rapid social, political and economic change in recent years. The research was conducted in the middle class neighborhood of Beira, Mozambique, the country's second largest city. The neighborhood of Ponta Gea is home to people from a variety of ethnic backgrounds, ages, somatic types, and socioeconomic and educational levels. All participants were adults over the age of thirty who are Mozambican citizens currently living in Ponta Gea.

The research was conducted in two phases: the first ethnographic and the second a house-to-house survey. The cultural models of lifestyle and social support were developed in the ethnographic phase. There was strong consensus among the Ponta Geans about the elements of these two models. The research team interviewed 261 people in the survey during the second phase. At the end of the interview, participants had their height, weight and blood pressure measured.

The survey data suggest that consonance with the model of a successful lifestyle was predictive of higher blood pressure, as was age and obesity. Wealthier Mozambicans had higher blood pressure than their poorer counterparts. Social support had a mild buffering effect on blood pressure, controlling for lifestyle, age and obesity. The results suggest that more research is needed to understand the mechanisms through which psychosocial stress leads to negative health outcomes and work is needed to develop new methods for measuring this connection.

CHAPTER 1 INTRODUCTION

The study presented here emerges at the intersection of two large endeavors within anthropology: the study of societies in transition and the study of health within its cultural context. Two related universals in the human experience form the foundation of this research: cultures are constantly changing and all humans experience illness. The research question is based on these universals and contributes to these two endeavors. The research project described in this dissertation examines how psychosocial stress arising from culture change leads to ill health, specifically high blood pressure.

Mozambique is an ideal setting for this research because it has undergone tremendous social, economic, and political changes in the last decade and a half. I chose high blood pressure as the health outcome for four reasons. 1) Blood pressure readings are a non-invasive measure of stress that can be collected easily in field settings without the need for laboratories and refrigeration. 2) The incidence of chronic diseases, including hypertension, is increasing across Africa and to slow this increase we have to have a better understanding of the causes of hypertension. 3) On a predissertation visit, Mozambicans told me that high blood pressure is becoming more of a problem in recent years, which they attribute to the changes taking place there, and they asked me to study it. 4) Finally, there is a substantial amount of research on blood pressure in both anthropology and public health, providing a solid comparative basis for my research.

Culture Change and Intracultural Variation

Defining Culture

In order to present topics like culture change and intracultural variation, I start with a brief discussion of culture. In this dissertation I use a definition of culture that draws on the work of Shore (1996), D'Andrade (1984), Handwerker (2002), and others, who emphasize the cognitive nature of culture, with less emphasis on behavior. Handwerker (2002) summarizes Edward Tylor's 1871 definition of culture as "the knowledge people use to live their lives and the way that they do so" (p. 107). Handwerker also offers his own definition of culture as "the systems of mental constructions that people use to interpret and respond to the world of experience, and the behavior isomorphic with those systems of meaning" (p. 109).

Dressler (1999a) explains how D'Andrade's (1984) model of cultural meaning systems is useful when studying intracultural variation.

This in essence is a cognitive model of culture, in which culture is viewed as the knowledge that individuals learn in socialization and share with other members of the society that enables individuals to resolve routine problems and to make sense of one another's behavior. At the same time, this theory places considerable emphasis on the *meaning* of events and circumstances and ideas. (p. 595) (*italics added*)

D'Andrade's "notion of culture as a shared and learned culture pool" is central to both cultural consensus modeling and the study of intracultural variation (Romney et al. 1986), which are explained below. Culture is shared and learned by members of a group, but it is not equally learned or shared by all members. As we study variation in cultural knowledge, we learn about people's roles in a society, the flow of power and knowledge, and the economic, health, and social outcomes of this diversity within one group.

Like D'Andrade, Shore (1996) builds his theory of culture on cultural models. For Shore, there are three mental models, two personal and one conventional. The first two models are at the individual level: psychological and cultural. Shore's third mental model, "instituted models," is based on Geertz's notion of templates, which are held at the social level. "Instituted models are the external or public aspect of culture, and represent common source domains by which individuals schematicize conventional mental models" (Shore 1996 p. 312). For Shore, the link between external cultural models and the two types of individual mental models is meaning. According to him, humans can retain individual knowledge bits, but they also assign meaning to these bits, and this meaning is infused with culture.

Culture Change

Many forces affect culture change. For years, anthropologists, sociologists, and other social scientists have studied modernization, the process by which "traditional" people became "modern" (cf., Inkeles and Smith 1974, Barth 1967). Usually this process is assumed to include the adoption of Western modes of production, reproduction and consumption. This phenomenon was also referred to as acculturation or westernization.

Critics of these studies questioned the value or power associated with being modern, challenged the assumption that western culture was the model of what was modern, and asked whether all societies travel along the same trajectory on an inevitable path toward modernity (F. Cooper 2001). Modernization studies have fallen out of vogue, and have been replaced in the last decade by a growing interest in globalization. Globalization commonly refers to the adoption of western economic systems and cultural traits by non-western people, or "one-way flow of culture from the West to the rest" (Inda and Rosaldo 2002 p. 35). A noted African historian notes the limitations of these studies

when applied to Africa, "Like modernization theory in the 1950s and 1960s, globalization talk is influential--and deeply misleading--for assuming coherence and direction instead of probing causes and processes" (Cooper 2001, p. 189).

Pelto and Pelto's (1975) descriptions of culture change and how new ideas and behaviors are integrated into a cultural schema are highly relevant to my research in Mozambique. In their discussion of the stereotype of peasant communities' opposition to change and modernization, they state that some studies "show that there are significant intracommunity variations in response to outside change agents and other forces of modernization" (p. 5). The Peltos also write about culture change and the role of individuals and small groups in instigating change. "[W]e can suggest that successful innovations by individuals (sources of variation) may be noticed by others, who take up the new patterns while discarding previous practices" (p. 15). Homogeneous models of culture change do not allow for the possibility of change coming from within a culture, unless innovations come from people who can be labeled as deviants. A model based on intracultural variation allows for change from within and shows how new ideas are adopted within a group. In Mozambique, there is intracommunity variation in the adoption of new ideas and behaviors, which come from outside as well as from within the community.

Dressler (1999) reviewed the literature on modernization and blood pressure, and found that "research has progressed from hypothesizing that culture change is stressful, to trying to operationalize theoretical models of what it is about culture change that is stressful" (p. 583). He found that "delocalization" is a better term for describing what is usually termed modernization. Originally described by Pertti Pelto in 1973, delocalization

is the process whereby a community becomes increasingly dependent on energy and information that comes from outside the community (e.g., gasoline engines and the know-how to maintain them). Dressler envisions a number of changes that result from delocalization, including "the adoption of non-local standards of behavior for awarding social status" and the emergence of "marked socioeconomic inequities" (p. 586).

Modernity and Culture Change

Weisner and Abbott (1978) studied rural and urban Kikuyu and Abaluyia women in Kenya using an "overall modernity scale," and the psychosomatic symptoms test, which were developed by sociologists Inkeles and Smith. They found important differences between the two ethnic groups, with the Kikuyu scoring higher on the modernity scale. Surprisingly, in both ethnic groups, rural women scored higher on the second scale, leading the authors to conclude that "urban residence can be much less stressful than rural residence" (p. 437). Ethnographic research suggested that stress among rural women comes from taking over the responsibilities of men who worked in the cities, loss of child labor because of schooling, unbalanced reciprocity with the husband's family, and indirect involvement with modern urban institutions. Weisner and Abbott reviewed 22 other studies of stress which used cross cultural and comparative data, and conclude that "regional and intracultural analysis of contexts should help in understanding the relationships of stress, modernity and contextual variables" (ibid p. 446).

Intragroup Variation

The research presented here focuses on intragroup variation in blood pressure. Anthropologists have traditionally relied on cross-cultural comparison in their research. Yet focusing on intracultural variation draws our attention to the fact that, while culture is

shared and learned by members of a group, it is not **equally** learned and shared by all members.

Romney (1994) traces this approach to Edward Sapir (1938), an anthropologist who was among the first to raise the problem of intracultural diversity. Sapir pointed out that, with anthropology's focus on communities, the individual was often left out and there appeared to be no allowance made for individual variation in cultures. Sapir's seminal observation had not been incorporated into the discipline by the 1970s when Pelto and Pelto (1975) observed that anthropologists continued to shy away from informants who do not behave or think about their culture in normative ways. People who do not follow the "rules" are usually considered deviant, and anthropologists have not always adequately pursued the question of why these people are different. Perhaps the way we ask questions prompts our informants to give us uniform or generalizable descriptions. Maybe we suspect that informants who tell us something different than what we expect to hear are lying, or making up their answers. Maybe they simply want to tweak our general approach to their culture. However, there is more to intragroup variation and deviant or unexpected answers than inaccurate informants. An intentional examination of intragroup variation, designed to investigate the patterns that exist in knowledge and behavior, provides anthropologists with a richer understanding of the culture being studied.

Cultural Consensus Modeling to Study Variation

An Overview

Boster (1986, 1987) found that knowledge about varieties of manioc varied by gender and kin group among the Aguaruna Jivaro. Women in the group knew more than men, and women within a particular kin network had patterns of knowledge that were

most similar to other women within their kin group. Earlier, Romney and D'Andrade (1964) had asked high school and university students to take a triad test of kin terms and tested the hypothesis that there is one cultural norm about kin terms. Reanalysis of the data using multidimensional scaling (Wexler and Romney 1972) showed that two models of kin terms were present, one used by approximately 70% of respondents and another used by 30%. Wexler and Romney (1972) said that this was a "cautious, exploratory" approach to the study of human variation, made possible by the advent of multidimensional scaling and computer-based data analysis.

When intracultural variation is the focus of the research, anthropologists study individuals and subcultures, rather than whole communities or culture groups. This does not mean that we are reducing our explanations to psychological factors, nor are we forgetting the larger social systems. The patterns that we find at the subgroup level must be placed within the context of the culture. Pelto and Pelto (1975) cite Goodenough, who states that since culture is learned, "its ultimate locus must be in individuals rather than in groups" (1971 p. 20), and they urge anthropologists to focus on intracultural diversity.

Within one society we may find a number of subcultures that hold different perspectives and have special knowledge. Handwerker (2002) writes that people are affected by who they are, and how they have interacted with the world. Women and men, for example, could belong to different subcultures, as could youth and senior citizens. In his work in an African American community, Dressler (1991) found that younger people had a model of social support more heavily biased toward nonkin than did their parents, whose social support model favored kin members.

Applications of Cultural Consensus Modeling (CCM)

Cultural models created with consensus modeling can be compared across groups (cf., Weller et al. 1993, Weller and Dungy 1986, Chavez et al. 1995, Hurwicz 1995), or the models can be used to study intragroup variation (cf., Dressler, dos Santos, and Viteri 1986, Garro 1986, Garcia et al. 1998, Caulkins and Hyatt 1999, Weller 1983).

Sometimes there is less intragroup or across group variation than anticipated. Caulkins (1998) expected to find variation in the advice given by different types of business advisors, but found that government, university, and private business advisors shared the same cultural model of what constitutes success. Likewise, Kempton, Boster and Hartley (1995) sampled from five maximally diverse groups of Americans to find out how much they differed on their views of the environment. There was higher consensus than expected, even when comparing extreme environmentalists and political conservatives. Handwerker (2002) found that patterns in parents' perceptions of what constitutes a good parent-teacher relationship do not mirror our classification of subcultures. Latino parents' perceptions do not cluster together as we might expect. Instead, two distinct groups emerge, each including both Latino and Anglo parents.

How CCM Reveals Intracultural Variation

Cultural consensus modeling (CCM) is explained more fully in the third section of Chapter 3. The goal of CCM, as I am using it here, is to identify a few highly knowledgeable informants who can provide culturally appropriate descriptions about a particular cultural domain – like the rules of Major League Baseball, types of manioc plants, or ways to treat malaria. Once the group model for the domain has been elaborated by these informants, the next step is to measure how individuals deviate from it. Dressler has used this two-step approach successfully in Brazil and the U.S. (cf., 1999)

to create cultural models of lifestyle and social support and to test for variation from them.

The Effects of Culture Change on Health

Health Outcomes Resulting from Culture Change

Urbanization is an important component of culture change. As people move from rural areas into the cities the way they earn a livelihood changes dramatically, as does the social structure in which they live their lives. I chose an urban community for my research precisely because urban lifestyle is dramatically different from the rural subsistence lifestyle in Mozambique, and because we usually see a shift from a kin-based to a nonkin-based network for social support in urban areas. The epidemiological profile is often transformed with urbanization and the concomitant changes in lifestyle, as described below.

When societies change their modes of production, the pattern of disease also changes. With the advent of agriculture and the introduction of a sedentary lifestyle, an increase in communicable diseases is noted (MN Cohen 1989, Armelagos 1991). As hygiene, sanitation, and nutritional status improve, many societies move from a health profile dominated by infectious diseases to one made up primarily of noncommunicable diseases and very few infectious diseases. The epidemiological transition from infectious disease to chronic diseases has been noted in the U.S., Japan, and most western European countries.

Most African countries have not undergone this second transition and are challenging the notion that it is a universal process. Mozambique, like many of her neighbors, is experiencing a double burden of infectious diseases accompanied by an increasing frequency of chronic disease afflicting her citizens.

In this dissertation, my focus is on culture change and noncommunicable diseases in a society that previously suffered primarily from infectious disease. Several noncommunicable diseases are referred to as "diseases of civilization," including cardiovascular disease and stroke, diabetes, and some types of cancer. Cardiovascular disease, in particular, has been associated with changes in lifestyle that accompany modernization: sedentary lifestyle, dietary changes, urbanization, and decreasing levels of social support.

Lifestyle

Lifestyle is the primary mediating factor between culture change and negative health outcomes. Biomedical and social science researchers alike are interested in the question "How does the way that people live influence their health?" Although we may use the same terminology, there is a striking contrast in our meaning. For biomedical researchers, lifestyle usually denotes individual decisions and behaviors that affect a person's risk for disease e.g., smoking, diet, exercise patterns, and sexual practices. Researchers who focus on these behaviors are interested in explaining the incidence of disease and usually measure lifestyle at the individual level (cf., Kaplan 1990). According to Coreil, underlying this use of lifestyle is "the notion that personal habits are discrete and independently modifiable, and that individuals can voluntarily choose to alter such behaviors" (1985 p. 428). Yet, lifestyle does not always hold a negative connotation in biomedical research. Some behaviors (i.e., regular exercise) and decisions (i.e., abstention from high-risk sex) are categorized as health promoting, and are held up as examples to at-risk individuals who need to change their unhealthy lifestyle.

In contrast, anthropologists tend to focus on the way people live. We see lifestyle in a broader sense, including behaviors that may not have a direct impact on health. For

my research, lifestyle is important within the context of culture change and stress. The construct includes not only behaviors such as diet and exercise, but also how they communicate and learn, what they think, dream, and worry about, relations with their spouses, friends, and families, and strategies for adapting to the changing world in which they live.

Anthropologists have been observing change in societies since they have been studying them. As societies come into contact with each other, the lives of people in those societies change. Whether we call this contact and its effects "culture change," "acculturation," "modernization," or "globalization," we know that having social cues, rules, and expectations change is stressful.

Psychosocial Stress

Cassel (1976) acknowledges the difficulties in defining and operationalizing the various forms of psychosocial stress caused by culture change. He reviews several studies in which the concepts of social change and social and/or family disorganization were measured and found to predict a number of different health problems. Henry and Cassel (1969) note that stress is heightened when people are subject to new social expectations and the behaviors they had learned as children are no longer the norm. Cassel (1976) encourages intervention, in both reducing exposure to stressors and in strengthening social support, to avoid the development of these illnesses. The nature of social support often changes during the modernization process, as people move away from their kin and begin to live more detached lives.

High Blood Pressure in Africa: An Overview

High blood pressure is an intriguing condition because it is multifactorial and the contribution made by psychosocial factors is still in the process of being understood. I

review the literature on blood pressure in Africa in Chapter 3, but highlight a few of the most important findings here. High blood pressure is universally found to increase with age and obesity (usually measured by body mass index, weight divided by height), including most African populations.

The relationship between socioeconomic status and blood pressure is different in most of Africa compared to the West. Wealthier people in the western hemisphere and in Europe are thinner than the rest of the population and tend to have lower blood pressure. In most African populations, with the exception of South Africa, studies show that wealthier people are heavier and have higher blood pressure than poorer people in the same groups. The inverse pattern of socioeconomic status and blood pressure is an important element of the present study and in the interpretation of my findings.

The Research Project

After visiting Mozambique in 1999, I became interested in the question of how recent changes in Mozambique are affecting people's health. Mozambicans I interviewed during that preliminary visit told me that they were suffering an increase in the frequency of hypertension, or *tensão alta*, and attributed it to the rapid transformations following the end of the civil war (in 1992). I chose to approach the question by looking at intracultural variation in access to culturally appropriate models of lifestyle and social support. Dressler has developed this model for assessing cultural consonance, or the lack of it, as a stressor and a cause of hypertension (Dressler 1999, Dressler and Bindon 2000). Dressler developed his model in Brazil and in the U.S., and encouraged me to test it in urban Mozambique.

Mozambique, like Brazil, is a Portuguese-speaking country with historical ties to Portugal and her history of colonization. Yet, Mozambique continued to be a colony for

nearly a century after Brazil had her independence. More than 99% of Mozambique's citizens are of African descent, whereas Brazil is home to a mix of people who are originally from Africa, Europe, and Asia, in addition to native Brazilians. More importantly, the relationship between socioeconomic factors and hypertension is opposite in Brazil and in Mozambique. In Brazil, high blood pressure is more common among lower socioeconomic strata, while in Mozambique it is a condition primarily afflicting wealthier citizens.

In the first phase of the study, I used ethnography to build the models of lifestyle and social support. I interviewed informants in the first phase of my research who were identified by other people or by me as having a specialized knowledge of lifestyle and social support. The methods and results of this phase are presented and discussed in Chapter 5. In phase two, I tested the two models developed in phase one and measured individual variation from them through a door-to-door survey of adults. The survey also included questions about perceived stress and life events, family history of hypertension, demographic questions, and anthropometric measurements. The methods and results of phase two are found in Chapter 6.

I spent 21 months in Mozambique between June 1999 and November 2001. During this time, there were three distinct periods of research. From June through August 1999, I defined the research question and studied Portuguese. During this time, I traveled around the country interviewing people from all walks of life, questioning my academic colleagues there, and observing urban and rural life. From January through June of 2001, I lived in Maputo and taught medical anthropology at Eduardo Mondlane University while also collecting preliminary data on stress and social support in that city through

interviews, participant observation and freelists. The main data collection period in the city of Beira ran from October 2000 through November 2001 and is described in detail in Chapters 5 and 6.

The calendar of activities below illustrates when the different parts of the research were done and the length of time of each activity.

	June- Aug. 1999	Jan.- June 2000	Oct.- Dec. 2000	Jan - Mar. 2001	Mar.- Apr. 2001	May- June 2001	June- Aug. 2001	Sept.- Nov. 2001
Pilot research								
Teaching								
Language Study								
Key Informant Interviews								
Participant Observation								
Freelisting								
Ranking								
Questionnaire Development								
Survey								
Quantitative Data Management								

Figure 1-1. Calendar of Activities.

Research Setting

The principal research on which this dissertation is based was done in the neighborhood of Ponta Gea, in the city of Beira, in central Mozambique. Ponta Gea was built by the Portuguese colonial authorities as a middle-class neighborhood, restricted to whites and selected Africans. Currently, a wide range of people call Ponta Gea home, people representing a cross-section of Mozambican society as well as foreigners. The research setting is described in detail in Chapter 2.

Comparison with the Methodology in Dressler's Research

In addition to the data on consonance in lifestyle and social support, anthropometric measurements, and blood pressure, Dressler and his colleagues in Brazil collect other data that I did not collect. Dressler uses two 24-hour dietary recalls for the

data on the intake of calories, protein, fat, sodium, and other nutritional indicators. I do not share his belief that 24-hour dietary recalls are useful in generating dietary information. They take a long time to do properly (minimum one hour), and yield only marginally useful information, which is, of course, subject to recall and social desirability bias (Bernard et al. 1984). If nutritional data are the focus of a research project, I believe that these shortcomings can be minimized and the efforts they require can be worthwhile. Dressler also collects genetic information from his respondents, which I did not do. In Brazil, Dressler works in four neighborhoods to compare socioeconomic levels. My research was done in one neighborhood of Beira that is home to people from a range of backgrounds.

CHAPTER 2 SETTING

Mozambique

Geography

The Republic of Mozambique is located on the southeastern coast of Africa, and is bordered by six English-speaking countries: South Africa, Swaziland, Tanzania, Zimbabwe, Zambia, and Malawi. The country is long and narrow, running north and south with a 2,500 km coastline along the Indian Ocean. The present capital, Maputo, is in the extreme south of Mozambique, near its borders with South Africa and Swaziland. The original Portuguese capital was on Mozambique Island from the sixteenth century until 1902, in the northern province of Nampula.

The country covers an area of 800,000 square kilometers, making it about twice the size of California (Nelson 1984). Mozambique is divided into ten provinces, which are usually grouped into three areas: north, center, and south. As is the case in most African countries, roads and railways were built to extract the wealth of the hinterlands to the ports, traversing the country in an east-west direction. Thus, north-south travel between the northern, center, and southern sections of the country is difficult at best, and nearly impossible during the rainy season.

Demography

The country has a population of slightly over seventeen million (Instituto Nacional de Estatística—INE--1999). The population is concentrated in the northern provinces of Zambezia (3.24 million) and Nampula (3.19 million), plus around one

million people living in the capital of Maputo (ibid). Like most developing countries, Mozambique's population is young, with nearly 45% of the people under age 15 (INE 1999).

Ethnicity and Language

There are ten major ethnic groups in the country, which encompass numerous subgroups with diverse languages, cultures, and history. The largest of the ten major groups are the Makua, the Tsonga, the Lomwe, the Sena, the Makonde and the Ndau. (CountryWatch.com 2002). Ethnic groups in the north are primarily matrilineal, while the south is patrilineal, with the divide occurring roughly along the Zambeze River.

Portuguese is the official language in Mozambique, which also recognizes 13 other major languages: Emakhuwa, Xitsonga, Ciyao, Cisena, Cishona, Echuwabo, Cinyanja, Xironga, Shimaconde, Cinyungue, Cicopi, Bitonga, and Kiswahili (ibid). English is taught in many of the country's secondary schools. According to the 1997 census, 40% of adult Mozambicans report being able to speak Portuguese (INE 1999). There is a striking difference between the urban areas where 72% of adults speak Portuguese, and the rural areas, where just 25% can speak it (ibid).

The inhabitants of Mozambique are primarily of African descent (99%), with .08% of the population of Portuguese or European descent, and .08% originating from India or Pakistan (INE 1999). The majority of non-African citizens are concentrated in the urban areas, principally the cities of Maputo, Beira, Nampula, and Quilemane.

Religious Affiliations

Catholic missionaries were an integral part of the Portuguese colonial scheme, and today Roman Catholics make up about one quarter of the population. Nearly as many Mozambicans say that they belong to no religion (23.1%). During the socialist period

(1975 through the late 1980s), organized religion was strongly discouraged, which explains the high number of people in this category. The seventeen percent of Mozambicans who are Muslim mostly live in the northern, coastal provinces. Several mainstream Protestant denominations have been present in Mozambique for the past century, and their members comprise eight percent of the population. In the last decade, independent evangelical protestant churches have been growing rapidly, and today about 18% of all Mozambicans belong to these churches. (CountryWatch.com 2002).

History

Arab traders had been coming to Mozambique since 600 A.D., landing in the northern provinces of Nampula and Cabo Delgado where they established small trading posts. Vasco da Gama is usually given the credit for being the first European to land in Mozambique while sailing to India in 1498. But, in 1487, Pero da Covilha landed in present-day Beira (Sofala), and sent back reports of great gold riches to Portugal.

The Portuguese began to settle and trade in Mozambique in the 17th century, and they established a system of land concessions (*prazo*), to encourage Portuguese settlement. Throughout the 19th and early 20th centuries, the Portuguese struggled with the British over control of Mozambique. The British were interested in unregulated access to ocean ports for goods from Zambia, Zimbabwe (Northern and Southern Rhodesia), and Malawi, through rail and land connections to the coast of Mozambique. The Portuguese wanted to join their largest African colonies (Angola and Mozambique) into one large colony, but the British colony of Rhodesia stood in the way of this goal.

The Portuguese have long claimed that their colonization policy was nonracial, that all Mozambicans were citizens of Portugal, regardless of their skin color. Marvin Harris (1958, 1966), among others, has pointed out that some of these citizens were more

equal than others. The Portuguese colonial government did not make this hierarchy explicit, however. The division between the races was so thoroughly ingrained that "in Mozambique "Europeans Only" notices are not needed in order to maintain an almost perfect separation between the African mass and the Europeans" (Harris 1958 p. 4). Newitt (1995) describes the colonial racial classification system used to determine who was exempt from contract or forced labor. In 1917 a system was created whereby an African could be certified as *assimilado* (non-indigeneous), and thus fall into a protected category. In order to qualify as assimilated, an applicant had to show that s/he had incorporated Portuguese culture (including language and the Catholic religion), and had completed several years of formal schooling.

Forced labor was a cornerstone of Portuguese colonial rule because the colonial government earned a significant amount of money by selling contracted Mozambicans as laborers to the South Africa mines. Miners were required to work for a specified period of time, housed in barracks under poor health conditions. Harris details the agreement between the Union of South African and the Portuguese colonial government in the 1950s. "The South Africans pay the Portuguese government \$5.25 per recruit, permit the Portuguese to maintain tax collecting posts within the Union, deliver about half of the recruits' wages to the Portuguese authorities for payment when the laborer returns to Mozambique, restrict the maximum consecutive contract time to eighteen months, and guarantee repatriation" (1966 p. 27).

Portuguese policy inside Mozambique insured a steady stream of recruits for South Africa and Rhodesia. Mozambican men between the ages of 18 and 55 were assumed to be unemployed and thus forced to work in service to the government unless

they could provide proof of current employment, or proof of recently completing either military service or a labor contract in South Africa or Rhodesia. In order to avoid forced labor in Mozambique, many men took contracts in neighboring countries, returning home for six months, and leaving again before they were swept up and forced to perform unpaid labor in the colony (Harris 1958). Many of the migrant laborers used their wages to buy goods not available to other Mozambicans at the time, such as watches, bicycles, and radios.

Political Divisions

Expatriate Mozambicans learned of the nationalist movements in other African countries in the 1950s, and were able to organize in Malawi, Kenya and Tanzania. Inside Mozambique, the Portuguese state security forces successfully squashed any nationalist organizations that attempted to organize there (Newitt 1995). Three nationalists groups joined together in 1962 to become FRELIMO (Front for the Liberation of Mozambique) in Dar es Salaam, Tanzania. FRELIMO first leader was Dr. Eduardo Mondlane, an American-trained sociologist, who was working for the U.N. in New York. The armed struggle for the liberation of Mozambique from Portuguese rule began in the mid-1960s in the northern provinces along the border with Tanzania. The fight spread to the central/west province of Tete, which borders on Malawi and Zambia, in the early 1970s.

Independence from Portugal was granted following a military coup in April 1974 that overthrew the Portuguese Prime Minister Antonio Salazar. In July 1975, power was handed over to FRELIMO, a party that was unknown to most Mozambicans (except in the "liberated areas" named above), and that was "relatively unfamiliar with much of the country it was to rule" (Newitt 1995 p. 541). The first president of an independent Mozambique was Samora Machel, who replaced Eduardo Mondlane after the latter's

assassination by letter bomb in Tanzania in 1966. Samora Machel served as the leader of an independent Mozambique from 1975 until 1986, when he was killed in a plane crash (often blamed on the South African government), and was replaced by Joaquim Chissano, who is the current president.

In the late 1970s and early 1980s, Machel and FRELIMO espoused a domestic policy of scientific socialism, coupled with a foreign policy of regional activism. The former included a collectivization of agriculture, government control of all trade, and the active discouragement of all that was not deemed scientific (e.g., religion and traditional medicine). The latter policy meant that Mozambique actively supported efforts to overthrow white minority regimes in Rhodesia (later Zimbabwe) and South Africa. The FRELIMO government was Marxist-Leninist, and thus was identified as a threat to the stability of southern Africa in the Cold War.

The Rhodesian government of Ian Smith financed a group of Mozambican dissidents under the name RENAMO (National Resistance of Mozambique) to destabilize the FRELIMO government. When Rhodesia changed to majority (black) rule in 1980, the sponsorship of RENAMO was transferred to the South African Defense Force, which provided RENAMO with increased training and weaponry, and supplied bases inside Mozambique. A deadly civil war raged through Mozambique for most of the 1980s, causing four million citizens to flee their homes (Newitt 1995), and killing nearly a million people. FRELIMO renounced socialism in the late 1980's, and international aid agencies accelerated their efforts inside Mozambique to ease the suffering of the war-affected population.

The end of the Cold War and preliminary steps to majority rule in South Africa both contributed to the success of peace negotiations to end the Mozambican conflict. A peace accord was brokered by Saint Edigio, an Italian Catholic order, from 1988-92 and was signed in Rome in 1992. When the accord was implemented in 1993, tens of thousands of soldiers were demobilized, U.N. Peacekeepers arrived, and refugees and internally displaced people returned to their homes. National elections for president were held in 1994, and the leader of FRELIMO, Joaquim Chissano, won. Presidential elections were held again in December of 1999, with the same result, and Chissano is currently serving his final term as president.

The leader of RENAMO, Afonso Dhlakama, disputed the results of both the 1994 and 1999 elections, and insisted that he be allowed to name RENAMO governors in the provinces where RENAMO won a majority of the votes. Because the Mozambican constitution states that the ruling party names the governors, Dhlakama's request was not allowed. Following the 1999 elections, Dhlakama did not acknowledge Chissano as the winner, and threatened to establish a parallel government in Beira in early 2000. With intense international attention focused on the flooding in the south of Mozambique in February and March of 2000, Dhlakama did not carry out this threat. In the absence of political victory, he continues to threaten resumption of an armed conflict, relying on his power base in the center of Mozambique.

Although Mozambique's liberation movement began in the northern provinces, FRELIMO's core leadership, Mondlane, Machel and Chissano, come from the southern provinces of Mozambique. Many Mozambicans openly express their opinion that FRELIMO is biased toward the needs of the south of the country. FRELIMO chose its

candidate for the 2004 presidential election on June 8, 2002. They selected Armando Guebuza, another southerner, who has been active in FRELIMO since 1968, and was involved in negotiations of the Rome peace accord (AIM June 8, 2002).

Economic Situation

Since the civil war ended, the economic growth rate in Mozambique has averaged an impressive 10% per year, even in the year 2000 when the country suffered from devastating flooding in the south. The majority (70%) of the citizens are subsistence farmers, and most people are extremely poor, with the average per capita annual income at \$267 (INE 1999). The economy is growing in a few key areas. Commercial agriculture produces cashews, sugar cane, cotton, tea, and copra. An aluminum plant in Maputo (a joint-venture with South Africa) was the largest contributor to Mozambique's exports in 2001. Investments are being made to increase tourism, and the country earns money selling petroleum and natural gas, as well as by providing shipping and port services. The economy is also helped by remittances sent by Mozambicans working outside the country, and the sale of hydroelectric power from the Cahora Bassa dam to South Africa.

The Mozambican currency is the metical (plural meticaïs). The floods of 2000 triggered a sharp period of inflation, and the value declined from approximately \$1 = 12,000 meticaïs in June 1999, to \$1 = 16,000 meticaïs in June 2000. Inflation throughout 2000 and 2001 continued the slide in the value of the metical against the dollar. During the research period it dropped from \$1 = 18,000 in November 2000, to nearly \$1 = 21,000 in November 2001. The metical remained relatively stable in 2002, ending the year at around 24,000 per dollar. The World Bank required the Mozambican government to privatize state-owned assets in order to qualify for assistance. A structural adjustment program began in 1987, the Economic Recovery Program, became the Social

and Economic Recovery Program in 1990 in order to place more emphasis on the social aspects of economic change. By 1998, as Alden reports "over 850 state concerns had been sold off to Mozambicans or to Mozambican companies, while foreign equity interests in these purchases have stood at roughly 50 per cent" (2001 p. 85).

While privatization is designed to stimulate a free market economy, in Mozambique it has also had a role in "the deepening of the patronage networks as providing fresh sources of capital and unleashing Mozambicans' inherent entrepreneurial spirit" (ibid p.117). Western nongovernmental organizations (NGOs) poured into Mozambique in the late 1980s and early 1990s. Some NGOs work within the government ministry structure, while others work autonomously and create parallel programs. Mozambique is one of the most aid-dependent countries in the world, with an ever-increasing foreign debt and little autonomy to determine its expenditures (Hanlon 1996).

Medical Systems

Despite structural adjustment restrictions, the Mozambican government tries to provide access to biomedical services to its population. The staff at most hospitals and clinics is poorly trained and paid, not well motivated, and thus provide low quality services. In Maputo, there are numerous private clinics for those who can afford them, but the majority of the country relies on government health facilities. The government subsidizes health care by providing most consultations free of charge, and medications at a greatly reduced price in hospital and clinic pharmacies. Unfortunately, staff members often charge patients a fee for their services (although this is illegal) and hospital pharmacies claim to have few drugs available. Outside the health facilities there is a system of state-run pharmacies selling subsidized medications, plus private pharmacies, which are the best stocked but whose prices are too high for most Mozambicans.

There is a sharp contrast in basic health indicators between the urban and the rural areas. At birth, the life expectancy in the rural areas is 40.2 years, compared to 48.8 in the city (INE 1999). A similar disparity is seen for life expectancy at age ten, with rural men and women living to an average age of 46.3, while city dwellers live until age 49.5 (*ibid*). The crude mortality rate (all deaths per 1,000) is 14.3 for urban Mozambicans, but is 24.0 for those in the rural areas (*ibid*). Nationwide, 245 of every 1,000 children born alive die before age five (*ibid*). AIDS is a growing health threat in Mozambique, with an estimated 16% of the adult population now infected with HIV (Ministry of Health 2001). AIDS infection rates are the highest in the three central provinces of Manica, Sofala and Tete (*ibid*), possibly the result of the increased mobility of the population, particularly related to the movement of refugees and soldiers during the civil war.

The Portuguese colonial government attacked the practice of traditional medicine. Later the socialist FRELIMO government also persecuted it for being non-scientific. In sharp contrast, it is today officially embraced by FRELIMO under the rubric of AMETRAMO (The Mozambique Traditional Doctors Association), a government-sponsored group. Traditional medical practices in Mozambique encompass a range of diagnostic and treatment techniques. Practitioners use a variety of different treatments, including plant-based treatments, consultation with spirits, home births, divination through the throwing of bones or stones, and prayer with patients. Missionaries provided most of the early descriptions of traditional medical practices in Mozambique. Henri Junod (1912) first described the practice of traditional medicine among the Thonga in southern Mozambique as he observed it in the late 19th century. Dorothea Earthy (1933)

worked with Valenge women from 1917 through 1930, and describes their medical practices in a chapter her book on Religion, Magic and Sorcery.

In recent years, there has been an increase in research on traditional medicine across Mozambique. Two Mozambican anthropologists, Josefa Marrato and Alcinda Honwana have studied the ways in which traditional medicine was used to help the country recover from the civil war (Honwana 1997, Marrato 1996). Elisa Muianga (1996), a Mozambican historian, also researched the role of traditional medicine in healing war trauma, specifically among women who had been kidnapped by RENAMO. Robert Marlin (2001) studied traditional medicine, infertility, and AIDS in response to wartime experiences in Tete province. James Pfeiffer (2002) is engaged in an ongoing study of healing within emerging independent protestant churches. Harry West (1997) looked at sorcery and power in the northeast, and Christy Schuetze (n.d.) examined the reemergence of women traditional healers (*curandeiras*) in Sofala province. Carolyn Nordstrom (1997) documented the war between FRELIMO and RENAMO in what she terms "ethnography of a war zone", which includes documentation of the persecution and successes of biomedical and traditional healers.

Contact and Exchanges

Mozambique has had prolonged contact with other countries, particularly its neighbors in Southern Africa. Beginning with male labor migrants to South Africa and Zimbabwe, during colonial times, Mozambicans were exposed to Western lifestyles and the consumer goods they brought back. Nationalist leaders learned about different political and economic ideologies while in exile in Tanzania, Kenya, or other sympathetic African and European countries. Many Mozambicans studied abroad in countries as a result of scholarships provided in socialist solidarity between 1960-90. More recently,

students are beginning to study in the rest of Europe, Brazil, South Africa, and North America. In addition to these contacts, Mozambique was greatly influenced by the presence of European colonial powers, like Britain and Portugal. At independence in 1975, Portugal offered citizenship to Mozambicans with any Portuguese ancestry. As a result, many urban Mozambicans have relatives working or studying in Portugal, which is seen now as a gateway to the rest of the E.U. One indication of the strong links between Mozambique and Portugal is reflected in the routes of Mozambique's national airline (LAM). Non-stop flights to Portugal on LAM are offered several times per week, and it costs the same to fly to Lisbon from Maputo or from Maputo to the north of the Mozambique (approximately \$400).

Post-War Changes

I spent three months in Mozambique on a pre-dissertation visit in the summer of 1999. My original plan was to study the long-term health effects of war trauma and how traumatic wartime memories affected stress level and health. I traveled across the country, visiting eight of the ten provinces, interviewing and observing. I interviewed university professors, NGO employees, government workers, housemaids, truck drivers, and health care workers. I was told repeatedly that most people had put the war behind them, and that the most common stressor was change in the economic situation, owing to Mozambique's shift to a free market economy and the dictates of the World Bank. As the government privatized its holdings, previously secure government jobs were no longer secure. Non-productive factories were closed and the workers were laid off. This downsizing also affected the rural people, particularly those who participated in the cash economy growing cotton or cashews, as the government withdrew its support for those industries.

These economic changes are due to both internal and external forces, but determining the causes and assigning blame is not a high priority for most Mozambicans. What is most important is that they no longer have a job, cannot sell their crops for the same price, or fear that their livelihood may be the next victim of reforms. Under the colonial administration, job possibilities for black Mozambicans were extremely limited, and the government underpaid cash crop producers. In the first years of independence, anyone who had any formal education was pressed into service because of the needs of the country, the government payroll swelled, and agricultural subsidies were high. The latest turn on this roller coaster is the paring down of the government workforce, growth in the private sector, and minimal government investment in the agricultural sector. Job seekers must have appropriate credentials, compete for positions, and be productive in order to keep a job.

The potential for great wealth exists for some black Mozambicans, and consumer goods are pouring into the country. FRELIMO no longer restricts the type, quantity, and price of goods that can be sold, but few can afford the luxury items like CD players, cellular phones, and washing machines. To summarize what I was told in 1999, many Mozambicans feel like the rules of economic survival keep changing, and they are stressed by having to keep up with these changes, by having to play by rules that are different from the ones they learned growing up.

The City of Beira

Geography

Beira is the capital city of Sofala province, located on the coast of the Indian Ocean at the mouth of the Pungue river. The province had a population of 1,289,390 in the latest (1997) census, and the city is home to 397,368 inhabitants (INE 1999). Beira is

the second largest Mozambican port, providing access to the Indian Ocean for central Mozambique, and the landlocked countries of Zimbabwe, Zambia, and Malawi.

Proximity to the ocean make it prime for fresh seafood of all varieties, and for hot, humid weather during the summer months (October through March).

The city of Beira is divided into 26 bairros, eight in the "cement city", and 18 in the "reed city". Cement city is the term used for the areas where houses are of a solid construction (usually concrete block), while reed city describes neighborhoods where the houses are made of locally available materials such as grass, mud, stones, and thatch.

Religion

As Beira is at the crossroads of Mozambique, it is home to many religions. The Catholic Church has the strongest presence given its affiliation with, and assistance from, the Portuguese colonial government. The Franciscan arm of the Catholic Church established itself in Beira in 1898 (Newitt 1995 p. 435). Beira is also home to numerous protestant churches, Muslim mosques, and other places of worship.

The 1997 Census data are not available at the level of the city or the bairro, but it is divided into urban and rural areas of the province. In the province of Sofala there are two urban areas, Beira and Dondo (pop. 71,644) - ten miles away - while the rest of the province is classified as rural. The distribution by religious affiliation in rural and urban Sofala province is shown in Table 2-1.

Table 2-1. Percent religious affiliation, in urban and rural Sofala province (INE 1999).

	Zionist	Catholic	Protestant	Other Christian	Jehovah Witness	Muslim	Other	None	Don't Know
Urban	11.8	26.3	13.6	1.1	0.5	4.3	2.3	36.5	3.6
Rural	22.0	9.2	6.1	0.1	0.3	0.3	3.8	53.0	5.0

This table shows two important patterns in religious affiliation in the rural and urban areas. First, urban dwellers that claim a religion are mostly Catholic or Protestant,

with the category Zionist in third place. The same three religions are the most frequently mentioned in the rural areas, but the Zionist churches replace the Catholic Church as having the most members. The small number of Muslims anywhere in Sofala reflects the low number of Muslims in the center of the country, and a concentration of Muslims in the urban areas. Second, Western religions appear to play a more important role in the urban context, compared to rural areas, where 53% of the people report no religious affiliation. FRELIMO's policy of discouraging religion, both traditional and Western, was renounced in late 1980s. After that, churches have been growing steadily in membership, faster in the cities, and with the Zionist churches having more success in the rural zones.

Ethnicities in Beira

Referring again to the census data (INE 1999) for the urban areas of Beira and Dondo, racial or ethnic data on urban Sofala is presented in Table 2-2. The census uses the term "Somatic Type/Origin" for this classification. The breakdown of black and non-black citizens for Sofala province parallels the national statistics -- overwhelmingly of African ancestry but with some mixed and non-black residents, primarily in urban areas.

Table 2-2: Race and ethnicity in the cities of Beira and Dondo (INE 1999).

	Black	Mixed	White	Indian	Other	Unknown
Number	514,143	10,962	989	1,578	476	3,643
Percentage	96.7	2.1	0.2	0.3	0.1	0.7

History

Historically, the center of Mozambique, and Beira specifically, had a great deal of contact with neighboring countries, principally Southern Rhodesia (today Zimbabwe), Malawi, and South Africa, and with people from various European countries. Newitt (1995) states that in the late 1800's, there was little Portuguese presence in the colony, even in the two largest cities (Beira and Laurencio Marques). "There were numerous

foreigners – British, Boers, Germans and others – crowding the port towns of Beira and Laurencio Marques [today Maputo], but they were seen by the struggling colonial administration as a threat rather than as a help." (p. 364). The Portuguese could not manage the entire colony so they contracted out most of the territory to private companies that took responsibility for the administration (including taxation) and pacification of the people living there.

The Companhia de Moçambique was given control over the two central provinces of Sofala and Manica from 1891 to 1941. "The Governor of the territory and a majority of the board members had to be Portuguese" (Newitt 1995 p. 369), but the majority of the money was British or French, and the company came to be under the control of a Belgian, Albert Ochs. Primary projects in the territory during this period were the building of a railroad between Rhodesia and Beira, and the development of the port of Beira. These contributed to a mini-boom in the population of Beira, which in 1898 had 4,223 inhabitants (1,172 of them European). By 1910 there were 6,665 people living in the city (Newitt 1995). Newitt reports that Beira had a "distinctive British flavour" (p. 396), with sports clubs and bars catering to the British and the issuance of a "sterling currency" (ibid) by the Banco de Beira. By 1928 the city of Beira had 23,694 residents, of whom 2,153 were European (Newitt 1995 p. 442). The Companhia de Moçambique sold the railroad to the Portuguese colonial government in 1949, after their lease on the two provinces expired.

Beira was a popular vacation spot for white Rhodesians beginning during the period of the Companhia de Mocambique and continuing until 1975. After World War Two, the white population in Rhodesia expanded, and "Beira beckoned to them as a

seaside resort offering water sport and an element of Latin culture" (Newitt 1995 p. 469.) Their enjoyment of the beach, seafood and nightlife in Beira, primarily during the Easter holiday and the month of July (the coolest winter month), continued through to Mozambican independence (Alexander 1971).

During the civil war in Mozambique (1978-1992) the strategic Beira corridor was kept open by stationing Rhodesian, (later Zimbabwean), troops along the 250 kms from the coast to the border with Rhodesia (Zimbabwe). In December of 1990, an agreement between FRELIMO and RENAMO was signed that included a provision whereby "RENAMO agreed not to attack the rail corridors from Zimbabwe to the sea in return for the withdrawal of Zimbabwean troops to those corridors." (Newitt p. 573). During the civil war the city of Beira remained under government control, but RENAMO had, and still has, very strong support in the city, and across the province of Sofala. As noted above, Dhlakama moved to Beira following his loss in the 1999 presidential elections, did not recognize the election results and threatened to set up a parallel government.

As mentioned earlier, the government has privatized or closed down many of its holdings in the past fifteen years. In Beira, this included the shutting of several government-run factories and laying off their employees. At the same time, foreign companies are now permitted to operate inside the country. A Scandinavian telecommunications company won a bid to install cellular phone service in Beira beginning in 2000. A large South African company sells satellite television dishes and service which allow the wealthy to watch more than thirty channels, primarily from South Africa. Mozambican television was only introduced to Beira ten years ago, and carries a variety of news programs, Portuguese game shows, and Brazilian soap operas. Beira has

one movie theater where the cost of a ticket ranges from \$1.50 to \$2.25 and the films featured tend toward either action-adventure or romantic comedy genres.

Political Divisions

The majority of people in Sofala province back the RENAMO political party, and there is a strong feeling of neglect from the FRELIMO government in Maputo. RENAMO has requested that they be allowed to name governors in the provinces where they won a majority of the votes. Seventy-four percent of voters in Sofala voted for RENAMO's Dhlakama for president in 1994, and 79.9% voted for him in 1999.

RENAMO has a visible presence in Beira and across the province. On the 9th of November 2000, RENAMO sponsored demonstrations across Mozambique against the government. One of the larger rallies was held in downtown Beira. The RENAMO office for Sofala province is on the main street of Beira, in the posh residential neighborhood of Macuti. There is strong resentment in Beira that the FRELIMO government neglects the center and north of the country. Popular belief is that it only provides infrastructure and other development to the southern provinces, home to most of its supporters.

One often-cited example of this neglect is the state of the roads in Beira compared to Maputo. The roads are in terrible shape, with huge holes and crevasses filling up with mud and/or water during the rainy season. The paved roads are poorly built and maintained, and the unpaved roads (primarily in the reed city) turn to mud and many are impassable for several months. The national government awarded a contract to a South African road repair company that started work in August 2001 and was continuing to repair roads throughout the city when I left in November 2001.

A new FRELIMO governor was transferred to Sofala province from neighboring Manica province as the research began. Felicio Zacarias has popular support and people

have high expectations that he will be a positive force in bringing development to the province. He has denounced corruption and incompetence in the provincial government, and in a populist gesture, opened the road in front of his residence to traffic. It was previously closed from 7pm to 6am. The governor has fired medical staff members who provide poor service to or demand bribes from citizens, and he is rumored to drive around in Beira incognito to entrap policemen seeking bribes (AllAfrica.com 2002).

Race Relations

During Portuguese colonial rule, blacks were not permitted to walk on the sidewalks in Beira, or to even be in certain neighborhoods after dark. Most of the cement city was reserved for white and a few Indian or *assimilado* residents. Black residents worked in these neighborhoods, but if they were there after dark they had to show a pass from their employer. The Portuguese built a hospital in the neighborhood of Ponta Gea for Europeans (Hospital dos Europeus), and another hospital for the "indigenous population" (Hospital dos Indigenes) in another part of town.

Today, people are generally free to live and walk anywhere in town. However, there are two gated (with barbed wire) communities in the neighborhood of Macuti, one for employees of the pipeline being installed between Beira and Zimbabwe. The second, often termed the "Apartheid complex", is for anyone with enough foreign currency to afford the rent. Guards monitor the entrance, stopping unknown blacks from entering, and allowing all whites (residents or not) to come and go. Many of the nicer homes in Macuti, Palmeiras and Ponta Gea have guards, who open and close the gate, and provide a degree of security.

The most difficult relations between ethnic groups are between blacks and Indians. Of the latter, those who come originally from South Asia are simply referred to

as Indian because their families usually immigrated before the creation of Bangladesh or Pakistan. The Indian residents we contacted for the survey were welcoming and usually agreed to participate. Still, my research assistants were surprised and commented on how hospitable the Indian participants were, noting that they had not previously been invited into Indian homes. They quickly added that they would not have received the same warm reception had I not been there, and probably would not have been invited in.

Health Care in Beira

Beira has one hospital (The Beira Central Hospital – HCB - formerly the Indigenous Hospital), a private clinic, and several government clinics. The European Hospital in Ponta Gea has been converted into a large health center, with various outpatient specialty clinics. A large number of the doctors at the HCB are expatriates, including German, Cuban, and Vietnamese doctors. The government clinics are designed to serve as referral points to the HCB and in many cases they fulfill this function. Rural residents usually consult a health clinic first for an illness, and obtain a referral form to the hospital if they require more attention. However, most residents of Beira go directly to the HCB outpatient department for their health complaints.

The private health care clinic opened in 2000 in the heart of the downtown, and is open 24-hours a day. Doctors from the HCB moonlight there after their shifts at the hospital. Interestingly, many doctors use the private clinic as a way to make contact with wealthy patients, who then continue their care at the HCB. The doctors are paid a flat salary for their hours at the private clinic, and are not allowed to charge the extra fees routinely found at the HCB. If a wealthy patient from the private clinic continues his or her care at the HCB, the doctor can charge a fee to give that patient priority access and avoid a long wait.

There are government subsidized pharmacies located at the hospital and health centers. As mentioned above, these often have very few drugs available. Beira also has subsidized pharmacies away from these health facilities. Medications can be purchased at private pharmacies and the open-air markets. These same markets also sell traditional medicines, although usually in a separate section of the market.

A nurse training school operates at the Beira Central Hospital, and a medical school at The Catholic University which opened in 2000. The two main problems contributing to poor medical services in Beira is a lack of medical personnel, and lack of adequate pay for those in the system. In addition, there is a general lack of modern equipment and poor maintenance of existing technology.

The AIDS infection rate in Sofala province is estimated to be 17.8% of people over the age of 15 (Ministry of Health 2001). The nationwide incidence rate is around 12% (ibid).

Traditional medicine exists throughout Beira, but it has a low profile in the cement city. A traditional doctor in Ponta Gea advertised in the local newspaper, but when I went to his house, the neighbors told me he had moved to Maputo because he was sick. A synopsis of Beira written by the Catholic University states "Traditional and modern medicine must collaborate with each other, each one knowing its own limitations" (Magondone n.d. p.29). This echoes the Mozambican national policy of collaboration between biomedicine and alternative or traditional medicines. However, I was never able to detect any evidence of collaboration with traditional healers during my many discussions and visits in Beira to the medical school, hospital, health centers, or provincial Ministry of Health.

Economic and Academic Setting

The two most important economic engines in Beira are the port and the railroad. These two work together to generate the bulk of the profits made in the province for the government. They link the landlocked countries of Zambia, Zimbabwe, and Malawi to the sea. Unrest and economic turmoil in Zimbabwe is threatening its ability to pay shipping costs, which could severely affect Beira's economy. The governor of Sofala province, Felicio Zacarias, recently commented on the potential impact of Zimbabwe's problems on the province. "The old products that used to be exported from Zimbabwe, .. are now being imported to Zimbabwe. ...this will have an impact on the economy, especially in the central region of Mozambique" (AllAfrica.com 2002).

Beira is home to the Catholic University of Mozambique (UCM), and a branch of the national Pedagogical University (UP). The UP is based in Ponta Gea and trains teachers in a variety of disciplines. The majority of the UP's students have been teachers at the primary or secondary level who were selected to continue their formal training. The UP is a national university with a diverse student body, including students of all ages, socioeconomic backgrounds, representing several provinces. There is a dormitory for single students, while married students rent off campus or live with relatives.

The main campus of the Catholic University is in Palmeiras, where the university administration and faculty of Medicine are located. The Economics faculty is located in Ponta Gea, and offers day and night classes. Approximately 500 students study economics at UCM and their Ponta Gea campus is expanding. UCM does not have an entrance exam like the national universities (Eduardo Mondlane U. and the UP). Admission is based on an ability to pay between \$500 and \$700 (U.S.) per semester in tuition, resulting in a primarily wealthy student body.

Ponta Gea

Geography and Demography

According to the most recent census (INE 1999), the neighborhood of Ponta Gea is home to 23,879 people, of whom 10,994 are female, and 12,879 are male. Slightly more than half the people living in Ponta Gea are over the age of 16 (14,321 or 60%), making its population older than the rest of the country as a whole. In my survey, I interviewed people in Ponta Gea who were over the age of 30. The recent census data (INE 1999) show that there are 6,050 over age 30 living in the bairro (or 25.3% of the people). Skewing of the population towards the younger age groups, a common pattern in developing countries, is seen across Mozambique.

Ponta Gea is one of the classiest neighborhoods in Beira, made up of predominantly large houses and enclosed yards, with seaside restaurants and a large (former) luxury hotel. A South African writer described Ponta Gea, and one of its landmarks, in a book about vacation spots in Mozambique (Alexander 1971). "Beira's most impressive hotel, the Grande on Rua Dr. Sousa Pinto in the fashionable Ponta Gea suburb, has long since closed its doors." (p. 126). The Grande Hotel was built during a short-lived Central African Federation in the 1950's, but was closed in the early 1960s due to lack of clientele able to afford its high rates. Today, the Grande Hotel is an urban planner's nightmare, a nice oceanfront location, yet inhabited by more than 1,000 squatters living without electricity, sanitation or running water. The Mozambican government is rumored to be planning to relocate these people because the hotel's foundation is sinking.

Ethnic and Political Divisions

Because it is an upscale neighborhood, the percentage of non-Mozambicans and non-black Mozambicans living in Ponta Gea is higher than the percentages given in Table 2-2 above. Although reliable statistics on the presence of non-black Mozambicans and foreigners in the neighborhood are not available for Ponta Gea, the research team found people with the following nationalities living there: Chinese, Brazilian, Indian, Spanish, Italian, Zimbabwean, French, British, Russian, Cuban, Portuguese, Canadian, Dutch, Norwegian, Greek.

While non-Mozambicans could not be included in the study, non-black Mozambican citizens were included, mostly of Portuguese and Indian descent. A total of 39 non-blacks participated in the survey portion of the research (15% of the total sample of 261), 16 of European descent, and 23 of Indian descent.

Housing

As mentioned earlier, the cement city, including Ponta Gea, was restricted to whites and a few *assimilado* blacks during colonial times. Prior to 1975, black citizens were allowed to work in homes and businesses in Ponta Gea, but had to leave by dark. When Mozambique became independent, the majority of Portuguese citizens fled the country, fearing for their safety.

At this time, the FRELIMO government nationalized ownership of all houses in Mozambique and allotted them to individuals and families. Many of the large houses in Ponta Gea were subdivided by their occupants into apartments and, along with garages and *dependencias* (outbuildings on the lot), were rented out to generate income. At the same time, there was an influx of residents moving, legal and illegally, into Ponta Gea, swelling the population of the bairro.

In the last decade, the Mozambican government began the process of giving occupants individual ownership of their residences. Each apartment or house's value was assessed and the people living in the house were allowed to make monthly installments to a government agency, hoping one day own their home. Homeowners (or owners-to-be) can rent out their apartment or house to individuals or businesses, banking the money as they live elsewhere. It is not unusual to see an NGO (non-governmental organization) office in one half of a duplex or a small government office on the first floor of an apartment building. The result is a bustling mix of individual homes, multiple-dwelling residences, commercial and government activity, plus educational and religious institutions co-existing in the neighborhood. Taking into account the changes that have taken place in the population of Ponta Gea in the 27 years since independence, it is not surprising that it is home to people representing a variety of socioeconomic, educational and religious backgrounds, coming from across Mozambique and beyond. A map of the bairro of Ponta Gea is found in Appendix A.

These non-residential installations are located in Ponta Gea:

- Universidade Pedagogica (one of three campuses in the country)
- The Economics faculty (classrooms, library, offices) of the Catholic University
- The City's main Catholic Cathedral, including its radio station, Radio Pax
- A variety of Protestant Churches
- The Governor's residence
- The National Institute for the Visually Impaired (school and residences)
- The Zimbabwean Consulate
- Six restaurants, including one that doubles as a nightclub.
- Three Bakery/Cafes.
- Police Station
- State-run Pharmacy
- Military / Police Out-patient Clinic
- Government Out-patient Clinic and Maternal Child Health Center
- Grande Hotel (now inhabited by several hundred squatters)
- Red Cross of Mozambique delegation offices.

- German Cooperation (GTZ) offices.
- Action Contre la Faim (a European Development agency).
- ACIDI-Voca, an American NGO.
- Special School for Deficient (Handicapped) Children.
- The Mozambican Secret Police office.
- An open-air market – the Bazaar of Ponta Gea.
- The city golf course.
- The cotton advisory board office.
- The sports center, basketball pavilion, and a soccer stadium.
- The Education Office for the City of Beira.
- The Marriage Palace (a non-religious wedding site)
- Two small hotels
- The World Food Program (U.N.) offices.
- Provincial Library.
- Provincial Meteorology Station.
- Offices of the Catholic Diocese.
- Provincial Agriculture and Rural Development offices.

Health Care in Ponta Gea

Biomedical services in Ponta Gea are available at the large health care center (formerly the European Hospital) or a clinic run by the Mozambican police. The latter was originally organized to provide health care to members of the force and their families. In the past few years, this clinic has expanded to include other clients willing to pay a nominal fee. Most of the people I interviewed in Ponta Gea refer to the Police Clinic as "private" because it is less crowded than the other health care center, clients who are not police pay a small fee, and it is run more efficiently. However, this clinic is technically not private because it is subsidized by the state and the staff are all government employees.

The health care center located in the former European Hospital offers a range of services, including several special clinics. The campus of the European Hospital was large and included more than a dozen buildings, but the present-day Ponta Gea health center operates in only part of these installations. Pre-school (well-child) clinics are

offered daily and are attended by fifty to eighty women and their children. The health center also has an evening outpatient clinic for those unable to attend during the day and a weekly clinic for the treatment of sexually transmitted diseases. Participants in our study who were found to have high blood pressure were offered a referral to the Ponta Gea health center for follow-up care.

Ponta Gea has three pharmacies, at the public and police health centers, plus one that is state-subsidized but freestanding. Just beyond the edge of Ponta Gea, inside the limits of the downtown area, is a well-stocked private pharmacy.

The Universal Church of the Kingdom of God (IURD) in Ponta Gea provides healing services for anyone who wants them. They hold services seven days a week, three times per day on weekdays. The Tuesday services revolve around healing mental and physical ailments. This church is one of the fastest-growing churches in Mozambique and healing is an important aspect of its appeal (Pfeiffer 2002).

Events of Note during Fieldwork in Beira

During the year I lived in Ponta Gea several important events happened there and across the country. On November 9, 2000, RENAMO organized demonstrations in several provinces. Forty people were killed and one hundred injured in the ensuing violence. In the northern town of Montpuez, seventy-five people who had been detained during the demonstrations suffocated in a jail on November 21st.

The next day, November 22, 2000, a well-known journalist Carlos Cardoso was assassinated outside his office in Maputo. At the time of his murder, he was investigating a case of bank fraud that was rumored to reach into the highest levels of the government. Dr. Antonio Siba Siba Macuacua, was appointed in April of 2001 by the government-run Bank of Mozambique to clean up and re-organize the failing Banco Austral. He died on

Saturday August 11th, 2001 after falling fourteen floors from the bank building, while preparing his final report, due that Monday.

Closer to home, we experienced other national events in Beira. The Mozambique national school sports festival was held in June of 2001. The primary venues were in Ponta Gea, where teams and individuals competed in basketball, track, soccer, and volleyball. The leader of RENAMO, Afonso Dhlakama, took up residence across the street from our home in Ponta Gea during July and August of 2001. He used the rented home as a base to visit and mobilize communities in the central provinces.

The FRELIMO national party congress was held in Ponta Gea for three days in mid-September 2001. President Chissano led the party as they re-dedicated themselves to reducing poverty, fighting crime and corruption, encouraging investments and rural development, and ending regional imbalances (AIM 2001). Around the same time, a retrospective on the life and work of Samora Machel, was on display at the Ponta Gea sports center. Despite the popularity of RENAMO in this area, the Machel retrospective was well attended, and many people I spoke with in Ponta Gea recall him, and the years he ruled Mozambique, very fondly.

CHAPTER 3 REVIEW OF THE LITERATURE

Introduction

This chapter begins with a review of the literature on risk factors for high blood pressure in Africa. From this overview, it becomes clear that the risk factor of psychosocial stress for hypertension is important but has not been sufficiently explored. Next, I review the topic of psychosocial stress: its causes, definitions, techniques that have been used to measure it, and how social support can mediate it. One source of psychosocial stress is dissonance with cultural norms. The final section of this chapter reviews the literature on cultural consensus modeling (CCM), and discusses how CCM can be used to create cultural models that are then used to measure an individual's consonance or dissonance with core cultural models.

Definitions of Terms Used

I use the terms *hypertension* and *high blood pressure* interchangeably in this chapter. When *blood pressure* is used alone, it refers to the measure of a physiological indicator. The type of hypertension discussed in this paper is *essential hypertension*, as distinct from pregnancy- or chemically-induced hypertension. The term Africa refers to the continent south of the Sahara.

The World Health Organization defines hypertension as arterial blood pressure above 140/90 mmHg (World Health Organization/International Society of Hypertension--WHO/ISH 1999), while many European and African countries define it as above 160/90 mmHg (Cruikshank et al. 2001, Steyn et al. 2001). Most published studies of

hypertension use one or both of these cut points to define hypertension. Normally, study participants who report taking antihypertensive medications are placed into a category of hypertensive. Their blood pressure measurements are usually excluded from the data analysis, since these may be affected by the medication.

Comparing epidemiological research on hypertension is difficult. Researchers often do not use standardized sampling, definitions of hypertension, or methods of collecting key data like age, blood pressure, and obesity. Most studies of hypertension in Africa are cross-sectional and use non-random samples, usually relying on hospital or clinic patients for subjects. Still, comparison is important, and we can find patterns despite this lack of standardization in measurement or sampling.

An Overview of Hypertension in Africa

Risk Factors for High Blood Pressure

Hypertension is attributable to multiple risk factors, although its specific etiology is unknown. It is not possible to identify one risk factor for the development of hypertension in a group or individual. A noted expert on hypertension in Africa, Dr. Walijom Muna (1996) explains: "...there is not one unique environmental or hereditary explanation for these geographic and ethnic differences [in blood pressure]. They are the result of a complex interaction between various genetic and environmental factors. We have to consider the psychosocial and cultural factors, even though they are difficult to measure qualitatively or quantitatively, because they could be very important determinants in the rates of hypertension" (p. 11S, my translation).

Despite the fact that hypertension is a multi-factorial condition, we can measure its established risk factors, evaluate their relative contributions to high blood pressure in Africa, while at the same time continuing to explore the contribution of other, less well-

documented risk factors. Lore (1993) hypothesizes that the main contributing risk factors for hypertension in Africa are "consumption of sodium salt and alcohol, psychological stress, obesity, physical inactivity, and other dietary factors" (p. 357). I begin with a brief overview of the more frequently studied risk factors (age, alcohol and tobacco use, diet, obesity, physical activity and sex), and then discuss the available evidence for social and psychological factors, including rural and urban residence.

Age

Early studies of blood pressure in Africa found little or no increase in prevalence rates with age (cf., Donnison 1929, Williams 1941, Shaper 1967). In the past 30 years however, most studies have noted an increase in risk with age. Urban residents of Dakar (Astagneau et al. 1992) had astonishingly high prevalence rates for the age groups of 55 - 64, and 65 and older. Women had rates of 66.7% and 81.8% respectively, while men had rates of 60.8% and 68% for the same age groups. In a Liberian study, women had a much steeper increase in risk with age than men (Giles et al. 1994). Lore notes that "virtually all the studies from West Africa show a rise in....blood pressure with age" (1993 p. 358). In a comparison of two populations in South Africa, Mollentze (1995) observed that hypertension rates increased with age in both the rural and the urban sites.

Alcohol and Tobacco Use

Available data on the effects of smoking and alcohol use on hypertension in Africa are currently inconclusive. A research team in Tanzania (Edwards et al. 2000) divided their respondents into daily smokers or non-smokers, and heavy drinkers vs. non-heavy drinkers of alcohol. The effects of these two variables had mixed results in their study of 1,698 people in an urban district and a wealthy rural area. In the urban area, hypertensive men were significantly more likely to be heavy drinkers than non-

hypertensive men, while hypertensive women were more likely to be daily smokers than non-hypertensive women (*ibid*). Yet, in the rural area, neither factor was significantly different between the groups. Mbaya (1998) observes that "most hypertensive presenting at [Kenyatta National Hospital] do not imbibe alcoholic beverages, do not smoke, consume very meagre rations of meats and their by-products" (p. 301). Despite Lenfant's (2001) generalization that "the risk factors for cardiovascular disease are the same in different populations" (p. 980), there is not consistent evidence that smoking or alcohol use are predictors of hypertension in African populations.

Diet: Salt

There is an ongoing debate about salt intake and salt sensitivity and blood pressure in African and African American populations (*c.f* Wilson 1986, Wilson and Grim 1991, Curtain 1992, Dimsdale 2000, Kaufman 2001). This debate centers on two issues related to salt; 1) low availability and use of salt in many parts of Africa prior to European contact, and 2) a selective pressure for an ability to store salt in these low-salt African populations.

During the Pleistocene . . . [m]an's sodium intake was most likely comparable to what the Bushmen obtain today from their natural diet. Perhaps this was adequate for early man most of the time. However, it is reasonable to postulate a small but constant selection pressure from sodium depletion heat exhaustion against those individuals who lost more sodium during a hunt. (Gleiberman 2001)

One explanation for the low blood pressure readings found among pastoralists in East Africa is that they have a very low salt intake. Mugambi and Little (1983), note that low salt intake, along with "absence of stress of civilization and low dietary fiber" (p. 869) contributes to low blood pressure among the Turkana of Kenya. Lore (1993) explains that ash was previously used in Kenya to flavor food, but that ash was replaced by salt as the preferred flavor enhancer. Hunter et al. (2000) studied blood pressure in

three groups of rural Zimbabwean women ($n=515$). Sodium-potassium ratios were predictive of high systolic and diastolic pressure for all age groups. (This study is described further below, in the section on intra-rural variation.)

Damasceno (1999, 2000) studied sensitivity to salt intake among hypertensive patients in Maputo, Mozambique. The author notes that salt sensitive hypertension is generally found at higher rates among black hypertensives when compared to whites, is correlated with age and obesity, and that salt-sensitive patients tend to experience a higher climb in blood pressure over time (1999 p.28). A recent pilot study with 20 participants in Ghana (Cappuccio et al. 2000) found that reductions in urinary sodium (encouraged by nutrition education) were accompanied by a fall in systolic and diastolic blood pressure.

Diet: Fat and Fiber

A study of Seventh Day Adventist seminarians in Nigeria showed no relationship between blood lipid levels and blood pressure (Famodu et al. 1998). Three groups were compared: strict vegans, semi-vegetarians, and non-vegetarians from nearby communities. Vegans were the thinnest of the three groups and had the lowest serum cholesterol. The difference in blood pressure was not significant between the groups, nor was it related to blood lipid levels. The authors conclude "Negroid Africans are constitutionally not predisposed to cardiovascular disease because of their dietary habits, though this may change by the advent of urbanization and subsequent adoption of hypertension-related dietary habits..." (p. 548). Mbaya (1998) reports that nomadic groups in East Africa, like the Samburu and the Maasai, do not experience the incidence of hypercholesterolemia or atherosclerosis that would be predicted when they begin to consume a high cholesterol and high fat diet.

Dietary fiber intake was low in a group of South Africans over age 65 who were studied by Charleton et al. (1997a), just 17g/day. A food frequency questionnaire was used to collect the dietary data. At the same time, hypertension was high in this group, 71.7%. Unfortunately, the authors do not present an analysis of whether there is an association between fiber intake and blood pressure.

Overweight

Obesity, usually measured by body mass index (BMI), is consistently positively associated with blood pressure across the globe. In Africa this is also true (Astageneau 1992, Kruger et al. 2001), although the magnitude of the effect varies by study and site. Being overweight, as measured by waist-to-hip ratio and body fat (skin fold) measurements, is also positively associated with blood pressure in Africa (cf., Luke et al. 1998).

Kadiri and Salako (1997) is the only study I found from Africa which did not find an association between obesity and blood pressure in either men or women, (urban Nigeria). However, Seedat (1998) observes "obesity makes an important contribution to hypertension, especially in urban black females of sub-Saharan Africa" (p. 395). Forrester et al. (1998) note that "[r]elative weight, usually characterized as body mass index (BMI) is the most reliable correlate of hypertension, ... the average BMI bears a close relationship to hypertension prevalence" at the population level (p. 466-7).

Physical Activity

Charleton et al. (1997b) examined the connection between physical activity and blood pressure in a group of 142 South Africans over age 65. Although reported physical activity was low and blood pressure measurements were high, no association was found between these two variables, for systolic or for diastolic blood pressure. Lack of physical

activity is an important factor in becoming overweight, and thus deserves more study in the African context. At the same time, it is extremely difficult to measure actual physical activity. Most researchers rely on respondent self-reports that are known to be unreliable, and the act of studying a person's physical activity usually serves to increase it, rather than reflecting actual activity rates (Kimherly et al. 2000, Forrest 2001).

Sex

It is unclear from the available evidence as to whether there is a sex difference in hypertension in Africa. Often, observed sex differences disappear when well-established risk factors such as age or BMI are held constant. A study of health status in urban Zimbabwe showed that women over age 45 had higher blood pressure readings than men of the same age (Watts and Siziya 1997). Their sample included 49 men and 71 women in this age group. The authors note high rates of obesity in the women they studied, and that "this obesity seems benign" (p. 264). Because this study was on general health status, the authors did not explore the relationship between obesity and blood pressure in their data. Edwards (2000) studied urban and rural men and women in Tanzania. The results showed an urban-rural difference, but no significant difference between men and women in either setting. Blood pressure was higher for women than men in both the urban and the rural sites in South Africa studied by Mollentze and colleagues (1995).

Social, Economic, and Cultural Factors

Schooling

Among African-Americans, higher education level is associated with lower blood pressure, and it is hypothesized that more education helps people cope better in a capitalistic society. In Nigeria however, educational level was positively associated with blood pressure (Ogunlesi et al. 1991).

Socio-economic status

Studies of socio-cultural factors that affect blood pressure in Africa usually include socio-economic status (SES) (including education, occupation and income) and urban residence. The next section examines the question of urban-rural difference in blood pressure. Urban residence in Africa may imply higher education and income, along with higher prestige occupations, although this is not always the case. Increasing SES level is correlated with increasing BMI in the African context (cf., Cooper et al. 1997), but researchers do not always separate the effects of SES from those of BMI on blood pressure.

Rural-Urban Patterns in Blood Pressure

Researchers have observed that urban Africans suffer more from hypertension than their rural counterparts. Although researchers do not know the mechanisms by which urban life contributes to increased blood pressure, much speculation revolves around obesity (from increased food consumption and decreased physical activity), increased sodium intake, and psychosocial stress. We can study the role of urban life in hypertension by examining more closely intra-urban variation, and the risk factors that lead to high blood pressure. This is what I have done in my research in Mozambique. At the same time, it is important to examine intra-rural variation, and to compare similar people in rural and urban settings.

Rural-Urban Comparisons

The Luo migration study in Kenya, compared rural and urban migrants from one ethnic group to explore the rise in blood pressure in urban areas. Researchers found that blood pressure was correlated with duration of urban residence (Poulter et al. 1984), and began to rise as early as two months after migrating to the city (Poulter et al. 1985). To

investigate selection bias, they compared rural Luo who intended to migrate with those who had no intention to migrate and found no differences in blood pressure (Poulter et al. 1988). Because blood pressure is associated with obesity, close attention was paid to dietary changes associated with migration, but it was found that the urban Luo actually consumed fewer calories. The authors concluded that weight gain in the urban (migrant) Luo must be related to "fluid retention, via an increase in renal efferent sympathetic nerve activity, as a consequence of an environmental stress" (ibid). I think that a decrease in physical activity might have also contributed to the urban Luo being overweight, despite lower calorie consumption.

Edwards et al. (2000) studied 1700 adults in a middle-income rural district of Dar es Salaam with a prosperous rural area, as part of an on-going study of adult morbidity and mortality. The rates of hypertension found by this research team do not differ significantly by area of residence. Mbanya (1998) studied 1058 adults in Yaounde, Cameroon, and 746 adults in three rural areas, 60 km away. Age-standardized prevalence for hypertension was higher in the urban area for both men and women. However, after adjusting for BMI, the differences in blood pressure disappeared because the urban sample was more obese than the rural sample. In Malawi (Simmons et al. 1986), an observed urban rural difference in blood pressure also disappeared after adjusting for obesity.

As part of a larger study on hypertension in the African Diaspora, Cooper's team (Cooper et al. 1997, Kaufman 1996, Kaufman et al. 1999), compared two communities in southern Nigeria. They found age-adjusted prevalence hypertension rates of 7.3% in the rural site, compared to 25.6% in the urban site. Obesity, sodium/potassium levels, and

social integration (as measured by social status incongruity) all explain part of this difference.

Consistent urban-rural contrasts in high blood pressure have been found in South Africa. Norman Scotch compared 1,000 urban and rural Zulu people in South Africa (1963a). The urban group had significantly higher blood pressure, related to age, obesity, and, for women – marital status, number of children, and church membership. Twenty years later, Seedat (1982) found hypertension prevalence rates of 25% among urban Zulu, compared with 9% among rural Zulu (160/95mmHg), and noted that the Zulu were affected by the stresses of an urban lifestyle. According to Packard (1989), this argument was made often by the South African medical community during apartheid to justify the policy of keeping Africans in *bantustans*, because city life was bad for their health. More recently, Mollentze and colleagues (1995) found no difference in blood pressure between urban and rural South Africans after adjusting for age and sex. Recent longitudinal studies of urbanization suggest that rural South Africans experience an increase in blood pressure when they move to the cities (cf., van Rooyen et al. 2002 and Vorster 2002).

Two early studies in Botswana (Kaminer and Lutz 1960, Truswell et al. 1972) found extremely low blood pressure measures, with no cases of hypertension. Although the authors noted that “acculturated” populations had higher blood pressure than did the rural Bushmen and women, they did not attempt to measure acculturation.

Intrarural variation

John Hunter and colleagues (2000) looked at variation in blood pressure in women in three rural communities in Zimbabwe, to test the hypothesis that the economic environment plays an important role. The research team identified women who participated in one of “three levels of economic development: 1) the traditional economy

on communal lands, 2) the wage economy in areas of large-scale commercial agriculture, and 3) the wage economy in mining areas" (p. 773). They analyzed data on 515 non-pregnant women to answer the question "Does increasing modernization in rural areas produce rising hypertension?" (ibid). Women involved in the latter two economic systems had higher blood pressure than women engaged in subsistence farming. The authors concede that because of a small sample "statistical validation weakens" (p. 782), and conclusions drawn about age can only be considered preliminary.

Giles and colleagues (1994) studied people from eight ethnic groups living on a rural rubber plantation in Liberia. They noted that "all groups were living under similar conditions" (p. 273), yet one group, the Mano, had significantly higher blood pressure readings than three of the other groups, after adjusting for age and sex. (Height and weight were not measured.). The authors note that although study participants lived in a rural area they did not live in a "remoteness from western culture" rather, they had "a moderate amount of contact with" it (Giles et al. p. 274) by virtue of living on a large rubber plantation.

Intraurban Variation

Astagneau (1992) randomly sampled 2300 people in an urban section of Dakar. He found that 10.4% of the people were hypertensive using the stricter definition (160/95mmHg), and 23.6% using the less strict one (140/90mmHg). No significant differences were found between women and men for either cutpoint. Age and obesity (BMI) were positively associated with blood pressure. This study is important because of the large sample size and the thoroughness of the research design.

In recent review articles, Seedat (1998, 2000) states that urban black South Africans are more likely to have hypertension compared to their white or Asian

counterparts, and that blacks develop the condition at an earlier age. In a study of blacks in an urban community in the Cape Peninsula of South Africa (Steyn et al. 1996), the age group 55-64 had the highest rates of hypertension, (40.5% for men and 47.2% for women). The most important predictors of hypertension were age, obesity, and degree of urban exposure (percent of life spent living in an urban area). Urbanization was measured as the percentage of an individual's life was lived in the city. They found "the increase in blood pressure with age among people who had spent less than 40% of their lives in the city was less than those who had spent more than 40% of their lives in the city" (p. 761).

Somova et al. studied students at the University of Zimbabwe (1995), over a four-year period. In addition to "traditional risk factors for hypertension: age, family history of hypertension, . . . alcohol consumption and smoking habits", the team also evaluated birthplace (rural or urban), family stability and two measures of "behavioural and psychological coping pattern" (p. 194). For white students, being born in an urban area predicted high blood pressure, while for blacks, being born in a rural area was predictive. In a poor urban area in Zimbabwe, Watts and Siziya (1997) found that blood pressure increased with age, and a higher percentage of women over age 45 had hypertension than did men in the same age group.

Regional Patterns in Hypertension Prevalence

A 1993 review article (Kaufman and Barkey) summarized what had been published about the prevalence of and risk factors for hypertension in African populations. That article divided the continent into four regions: west, southern, central and east. This regional approach reveals broad patterns of the prevalence of hypertension, despite differences in sampling and defining high blood pressure.

East Africa is often singled out as the region with the lowest blood pressure readings. High blood pressure is rare among nomadic pastoral groups, like the Turkana (Mugambi and Little 1983). In recent years, East Africa has also begun to show increasing rates of hypertension (cf., Edwards 2000). Mbaya (1998) reports, that "over the past 40 years there has been a progressive rise in the incidence of high blood pressure in East Africa" (p. 300).

In southern Africa, and particularly South Africa, high blood pressure is an important cause of morbidity and mortality. A review of all admissions to the main medical ward in Bulawayo, Zimbabwe showed that hypertension was the fourth most common cause of admission between 1987 and 1994 (Mudiayi et al. 1997). In Malawi (Maher and Hoffman 1995) hypertension is the ninth most common cause of admission to the main hospital in the capital. A sentinel reporting system of family practitioners in South Africa revealed that hypertension was the second most commonly reported illness for adults (de Villiers and Geffen 1998).

Wilson, Hollifield, and Grim (1991) divided the continent into the same four regions and compared mean systolic blood pressure data on 40-49 year olds collected by other researchers by region, as part of a meta-analysis. They chose this age group "because that is when essential hypertension usually manifests itself and secondary causes including pregnancy are less likely" (p. I-88). The meta-analysis did not control "for obesity, stress, diet or any other risk factors" (p. I-87). Despite the flaws of this analysis, the authors conclude that within Africa "[S]ystolic blood pressure was significantly lower for both men and women in East Africa than in the other three

regions. Women in Southern Africa had significantly higher blood pressure than those in West Africa, but the same was not true for men." (p. 189).

Comparing Africans and Africa Diaspora Populations

Hypertension in Africa needs to be considered within the context of the very high incidence of hypertension among members of the African Diaspora. High rates of hypertension in populations of African-origin in the New World is linked to higher morbidity and mortality in these same populations, when compared to other groups. Although the incidence of hypertension is not currently as high in Africa, research among African populations can shed light on the problem in diaspora groups.

Early work by Dawber and colleagues (1967) compared blacks and whites in the US with those in the Caribbean, and concluded, "Negro populations have higher blood pressures than whites living in the same areas and studied by the same investigators, particularly among females and in the older age groups" (p. 256). Until the last few decades, researchers have found low blood pressure readings in Africa (cf., Donnison 1929, Williams 1941, Hiernaux and Schweich 1979). In fact, some of the lowest blood pressure measurements have been recorded for lean, nomadic groups like the Turkana, (Mugambi and Little 1983), the Samburu (Shaper et al. 1969), and the hunter-gatherer Kung (Kaminer and Lutz 1960).

When we examine the patterns of high blood pressure in people of African origin, we find a consistent gradient of increasing prevalence. Hypertension prevalence rates are lowest in Africa, increase in Caribbean and Brazilian populations, and are the highest among blacks in the U.S. and England. Cooper et al. (1997) confirmed this trend when they compared seven population of West African origin. As expected, African Americans had the highest blood pressure rates, followed by Afro-Caribbeans, with Africans

(Nigerians and Cameroonians) having the lowest blood pressure readings. Wilson et al. (1991) state that populations of African-origin "have the greatest variation in blood pressure of any ethnic group" (p. I-87), ranging from very low in parts of Africa to extremely high in the U.S.

There is an opposite rural – urban gradient within Africa compared to the African diaspora groups. As discussed earlier, blood pressure increases with urbanization in Africa. In the U.S., the opposite is found. Wilson's team (1991) presents several explanations for the different effect of urban life and blood pressure in the U.S. compared to Africa. They suggest that, rural American black populations suffer as a result of low "[e]ducation and socioeconomic status a substantial impact of racist psychosocial stress in rural areas not felt in urban areas", and "genetic factors cannot be ruled out because rural black populations may have a lower degree of admixture with Caucasians than urban blacks" (p. I-90).

Walker and Sareli (1997) note the similarities in how coronary heart disease (CHD) appeared in white and black American populations, with the current situation in South Africa. They state that "the current low CHD mortality rate of urban Africans clearly resembles the situation which prevailed in the US and UK in the 1920's" (p. 24). The same authors note that certain risk factors for CHD, high fat and energy intake, hypertension, diabetes, and serum cholesterol are becoming more common in Africa, and thus "we can expect urban Africans to attain the high mortality rate for CHD now experienced by Afro-Americans." (p. 23). In order to avert an epidemic of CHD in a few years time, they recommend a "prudent lifestyle" including eating less fat and more fiber,

not smoking, reducing hypertension, and maintaining present high levels of physical activity.

Increasing Rates of Hypertension in Africa

An overview of the prevalence rates in various sites in Africa reveals three things. 1) There is an increase in blood pressure over the last 40 years. 2) There is an increase in blood pressure with urbanization. 3) Lack of standardized methods for sampling, blood pressure measurement, and defining hypertension makes it difficult to compare studies or establish continent-wide patterns.

An increase in hypertension in Africa mirrors an increase in chronic disease on the continent. Feacham (1992) points to three factors to explain the rise of chronic disease in adults in developing countries; demographic changes, including lower fertility and mortality rates, lead to a higher absolute number of adults, people are more exposed to risk factors like smoking, diet, alcohol, and reduced physical activity, and, success in treating infectious diseases has decreased case fatality rates, making chronic disease and injury relatively more important causes of death.

W. Lore, the editor of the East African Medical Journal, describes the trend of increasing blood pressure in Africa, with particular attention to Kenya (1993). He notes that beginning in the mid-twentieth century there was a rise in blood pressure, accompanied by a correlation between age and blood pressure that had previously been absent. High blood pressure is usually one of the first manifestations of chronic disease in adult Africa populations. Salako (1993) observes that the international community believes that infectious diseases deserve all of their attention in Africa. But he states that "the truth is that hypertension, ...is a major cause of morbidity and mortality in these countries, and by afflicting people at the most productive times of their lives, constitutes

a major impediment to economic development" (1993 p. 998). Razum (1996) points out that in Africa, cardiovascular disease is most commonly found to "be hypertension and its sequelae, not ischaemic heart disease like in industrialized countries" (p. 120).

Given the costs of treating high blood pressure and its sequelae, primary prevention of hypertension is the only feasible option open to most African countries. Yonga (1998) stresses that heart disease is "not an unavoidable concomitant phenomenon of socio-economic development", but argues that if Africans look to lessons learned in the West and make the lifestyle changes adopted there in recent years, "we may by-pass this expensive accompaniment to ... industrialization" (p. 494). Lenfant (2001), the director of the U.S. National Heart, Lung and Blood Institute, echoes this sentiment. "It would be a shame if the low- and middle-income countries went through the same rise in cardiovascular disease experienced by the wealthier ones although steps can be taken to reduce it" (p. 981).

Psychosocial Stress and Blood Pressure in Africa

While the established risk factors for hypertension discussed above are important areas of research, less work has been done on the role of psychosocial stress. Mbaya (1998) notes that psychosocial stress is a risk factor for hypertension in East Africa, because "superimposed on the individual personality and physiology are socioeconomic and cultural environments which produce their own effects (p. 301).

Nearly 40 years ago, Norman Scotch (1963a) assessed the contribution of socio-cultural factors to hypertension in a rural and an urban Zulu community. Having noted a striking difference in blood pressure between the two communities, Scotch asked, "can we now determine those factors, if any, that discriminate between hypertensives and normotensives in a community?" (p. 1206). He found that the number of children a

woman has is positively associated with hypertension for urban women, but not for rural women. Likewise, being post-menopausal in the rural area was associated with hypertension, but not for the urban women. Scotch explains these findings in the context of the different roles of women in the urban and the rural sites. The social status of rural Zulu women is closely tied to their ability to produce children, and menopause marks the end of this high status period, and is a stressful event. In the city, a woman is expected to earn a salary as well as produce children; therefore having too many children is stressful, while menopause is not.

A recent small study in South Africa (Edwards 1995), however, found no relationship between psychosocial stress and blood pressure. Edwards used three different measures of stress: the Township Life Events scale, and occupational stress scale, and an emotional reactivity scale. Blood pressure increased with obesity, but not with age or any of the three stress measures in the 30 men interviewed. Edwards (*ibid*) writes that a small sample size ($n=30$), and/or the absence of data on coping style or social support might explain the lack of a predicted association between these measures of stress and blood pressure.

Somova and colleagues (1995) compared psychosocial risk factors for hypertension in black and white students at the University of Zimbabwe, in a cross-sectional study and a four-year follow-up. They found that no psychosocial factors, (anger, anxiety, expression, active coping, family instability), predicted hypertension in white students. Among blacks, traditional risk factors - family history of hypertension, BMI, smoking and alcohol intake - predicted hypertension. In addition, for black students, family instability, the John Henryism Active Coping Scale (James 1994), and

suppressed anger were also predictive of hypertension, even after controlling for the factors noted above.

A sample of 54 patients admitted to the hospital in Niamey, Niger for complications from hypertension, were studied by Toure and colleagues (1992). The most frequent risk factors found were: Type A personality (76%), stress (48%), obesity (37%) and tobacco use (35%). Stress was measured in this study using an adapted Holmes and Rahe (1967) Social Readjustment Scale.

Discussion

It is clear that we have a lot to learn about the contribution of psychosocial factors to the development of hypertension in Africa. Research in this area will make three contributions. First, it will help us understand better the role of the many risk factors for hypertension in Africa, including the role of psychosocial stress, and this knowledge can be applied to prevention programs. Hopefully, it will also reveal the specific stressors of urban life on the continent. Second, knowledge gained by studying the role of psychosocial factors in Africa can be compared to patterns found in African Diaspora populations. With this, we can begin to unravel the mystery of why the latter have such high rates of hypertension, and why the rural-urban pattern is inverted in the west. Third, this research will advance our ability to measure psychosocial stress in a variety of cultural contexts. The scales and screening questionnaires currently in use in psychosocial research are inadequate to measure this phenomenon in different cultures, and more work is urgently needed to improve our tools in this area. The next section reviews the literature on the measurement of psychosocial stress and its relationship to specific health outcomes.

Defining and Measuring Psychosocial Stress

This section defines stress, specifically psychosocial stress (PSS), and discusses how PSS has been measured. Throughout the section, I give examples of how PSS is associated with different health outcomes, especially with cardiovascular disease. Stress has been linked to a variety of health outcomes, but the present discussion is limited to physical health outcomes. Ironically, the notion that mental processes (psychosocial stress) affect the physical body (increased blood pressure) runs counter to Cartesian dualism, even as I use its divisions between mental and physical health outcomes.

The term stress is used to describe a state of being of an organism, while the term stressor is used to denote an "environmental noxious stimulus" (Cassel 1976 p. 109). A useful definition of stress is "a psycho-physiological response to a change in the person-environment relationship in which the resource demands exceed the current level of resources available" (Oths 1991 p.16). Many authors use stress to describe the stimuli that provokes a response, but for that I prefer the term stressor. A stress response is an organism's reaction to a specific stressor, its attempt to counteract the stressor and regain homeostasis. This discussion is confined to the study of psychosocial stressors. The term psychosocial refers to a cluster of stressors that are produced by the social environment, and mediated by an individual's psyche.

Models of Stress

Howard and Scott (1965) reviewed eight conceptual models of stress, and concluded that most of these models are of limited use to researchers, because they were developed within one discipline and are thus designed to address discipline-specific questions. In addition, the authors note that these models of stress were incomplete, because none of them "take into account all of the relevant variables that produce stress"

(ibid p. 267). The stress models that are still in use have been expanded to apply to a wider variety of situations and attempt to take into account a wider variety of stressors. I consider Mechanic's (1962, 1978) and Selye's (1956) models to be the most useful in understanding the complexity of a stress response.

Mechanic (1962) developed a social-psychological model of stress caused by social situations. His model evaluated how people respond to stress, which he defined as "the discomforting responses of persons in particular situations" (1962 p. 7). Mechanic's model is helpful because it encompasses the entire stress response, including coping strategies, the social resources available to people, how people think about the stressful situation, and what they do about it. Later, Mechanic applied his model to health-seeking behavior (1978), and concluded that perceived stress (he used the term *distress*) is a powerful predictor of whether an individual seeks help for a health problem.

Selye's General Adaptation Syndrome (GAS) is a biochemical model of stress (cf., 1956). According to the GAS, the stress response in humans is characterized by a series of hormonal releases, which can ultimately lead to a breakdown in the body's immune response. The first stage of the stress response is an alarm and mobilization. This is followed by a stage of resistance, a set of internal responses to stimulate tissue response. "If the stressor continues to affect the organism despite these responses, the third stage, that of exhaustion, is eventually reached" (Howard and Scott 1965 p. 155). According to Selye, chronic stress leads to a permanent state of biochemical imbalance, which can then cause a decrease in the ability of the immune system's to function optimally, opening the door to a number of diseases.

Bieliauskas (1982) reports that Mason (1971) challenged Selye's conceptualization of stress as a purely biological response. Mason conducted experiments where the stressor was held constant (e.g., workload, undernutrition), but how those stressors occurs varied (e.g., speed of onset of the stressor), and found that, some people did not develop a physiological stress response. He argued that stress should "not be regarded primarily as a physiological concept, but rather as a behavioral one" (Mason 1971 p. 331). As Bieliauskas explains, "Any response an organism makes to stressors is likely mediated first at the behavioral level and then may have a secondary physiological impact" (1982 p. 5).

The context in which a stressor occurs may be as important as the stressor, and people's psychological characteristics play a large role in determining the stress response. My own model of stress draws on both Mechanic's and Selye's models because I believe that they complement each other. Mechanic's model describes the social context in which stress occurs and the potential for individual mediating factors, while Selye's explains the physiological response and potential long-term biological effects.

James and Brown (1997) reviewed anthropological research on the biological responses to stress, specifically the release of catecholamines and increases in blood pressure, and linked this work to Selye's GAS. Selye originally conceptualized the GAS in response to environmental stressors, but James and Brown point out that "psychological perceptions of events and relationships may be as important in eliciting the syndrome (GAS), as noxious environmental stimuli" (p. 315). For these authors, environmental stressors include "many things people do, think, or experience as a part of their lifestyle" (ibid. p. 329). A variety of physical and non-physical (psychosocial)

stressors can trigger the biochemical stress response (GAS), while, at the same time, individual behavior, personality, and social resources mediate their impact.

Psychosocial Stress

Psychosocial stress (PSS) is often poorly defined and operationalized. It encompasses a broad category of stressors, and many biomedical researchers use it as a catchall term for any concepts they do not know how to measure. Psychosocial stress is produced by social situations, making it less tangible than temperature or altitude or malnutrition, and highly subjective. It is mediated by an individual's psyche, as well as by the person's previous experiences and culture.

Psychosocial stress is often defined by what it is not. For example, all stressors that are not produced by the natural environment (e.g., climate, altitude, etc.), or are not nutritional in origin, are lumped together into this category. Definition by elimination leaves a varied lot of stressors in one category. Although we try to separate out psychosocial stressors from physical or nutritional ones, the social and the physical environments are inextricably linked. Most often, a research project will select one or more types of psychosocial stress, (for which a scale exists), and study PSS along with other (physical) stressors.

A quarter century ago, John Cassel (1976) summed up the current state of research on psychosocial stress and health, and set an agenda for the future. He credits Rene Dubos with broadening the scope of epidemiology from "acute or semi-acute infections caused by virulent microbial organisms" (p. 108), to a field that also takes into consideration that "environmental factors that are capable of changing human resistance" (ibid.). Cassel emphasized the importance of the social environment, and broadened the concept of stress, which had been defined primarily as a physical phenomenon.

Cassel (1976) builds on Selye's model of stress and envisions the connection between stressors, stress, and disease as leading to an imbalance in the endocrine system, which makes a person more susceptible to ill health. The stress state of an individual interacts with her genetic makeup and previous exposure to the stressor, and to an illness. Cassel pointed to two questions he felt that stress researchers needed to tackle; 1) whether specific stressors can be linked etiologically to specific diseases, and 2) whether stressors affect different people qualitatively or quantitatively in the same way. Most importantly, he proposes that researchers not look at "psychosocial processes as unidimensional, [as either] stressors or non-stressors, but rather as two dimensional, ..stressors, .. [which are] protective or beneficial" (ibid. p.112). Cassel's conceptualization of psychosocial processes as potentially harmful and/or beneficial opened the door for research on social support as a factor in the stressor - stress response equation.

Culture Change as a Stressor

Cassel (1960) suggested that culture change might be stressful to people for reasons other than changes in diet, exercise, or other health habits. He explained that culture change was confusing for people who were socialized in one culture were now confronted with a different set of social meanings. Dressler and dos Santos (2000) have based their work in Brazil on Cassel's notion of cultural incongruity, where individuals find that their culture is no longer helpful to them in the negotiation a new social world. Likewise, the cultural consonance model (described below) is based on the idea that "individuals can be low in cultural consonance... because they are, for whatever reason, unable to act upon the widely shared ideas about how to live life appropriately. In either respect, individuals .. are prevented from effective participation in their own society." (Dressler and dos Santos 2000 p. 312).

Anthropologists Scudder and Colson (1982) studied Zambian communities that were forced to relocate and identified three types of stressors; physiological, psychological, and socio-cultural. They note that socio-cultural stress is composed of many factors. It includes economic shocks, a leadership vacuum, and a reduction in what they term "a society's cultural inventory... a temporary or permanent loss of behavioral patterns, economic practices, institutions and symbols" (p. 271). The authors highlight various strategies used by communities to cope with forced relocation, ranging from conservative to high risk-taking. Individual- and group-level innovations are found in these communities, and a wide variety of coping strategies are employed. Scudder and Colson advocated more in-depth study of these innovations and strategies, as well the role of community and household dynamics in coping.

Measuring Psychosocial Stress

The most common measures of PSS are life events scales (cf., Holmes and Rahe 1967, Miller and Rahe 1997) and perceived stress scales (cf., Cohen 1983, Cohen and Manuck 1995). Unfortunately, these scales are often inadequate for the measurement of psychosocial stress in the populations for which they are designed, and even less effective when transported to other populations.

In the 1930's, Adolf Meyers began to measure life events and their effects on health. He noted that what patients tell physicians about their lives may be related to the illness they are suffering from. Hawkins, Davies, and Holmes (1957) formalized Meyers' idea into the Schedule of Recent Events (SRE), "which was used . . . over the next decade to document associations between stressful life events and" a number of diseases (Cohen and Manuck 1995). The Holmes and Rahe (1967) Social Readjustment Rating Scale built on the SRE.

The Holmes and Rahe scale (1967, 1997) measures stressful life events in terms of "life change units" (LCU). It is based on the thesis that all life changes are stressful, whether they are considered positive (e.g., marriage, the birth of a child, a new home), or negative (e.g., a death in the family, loss of a job). In this scale, each event has a LCU value assigned to it, and an individual's score is the total of these LCUs for the events that an individual reports, within the time frame specified. The Holmes and Rahe life events scale (1967) was recalibrated in 1997 by Miller and Rahe to reflect changes in the intervening years, and the influence of demographic characteristics on stress scores was compared. The most recent Life Changes Questionnaire (Miller and Rahe 1997) asks about 74 potential life change events.

The impact of life events is just one important measure of stress in a person's life, but an individual's perception of those events also needs to be considered. If a person does not perceive a life event to be stressful, then s/he may not experience a stress response. The Cohen perceived stress scale (1983) measures an individual's perception of stress, and has been used to predict a number of health problems. This more subjective measure of stress gives increased weight to an individual's personality and psyche, and begins to include the role of social support as a mediating factor.

Standardized scales may not measure the same thing among people who are from different populations than the ones the scales were developed for. To get the best measure of an individual's experience of psychosocial stress, scales should be developed for, or at least adapted to, specific settings. A thorough ethnography is necessary to understand the stressors being studied and how people experience, react to, and cope with them. Even knowing how people talk about stress is crucial. For example, a pilot study helped Oths

(1991) learn that changing a few key words or phrases (from "cope with" to "handle", and from "support" to "help") made the interview much more understandable to her informants.

Limitations in the Study of Psychosocial Stress and Health

Many studies of health status and PSS are cross-sectional or retrospective. This can be a problem, especially when respondents are told they have a health problem, and are then asked about their stress state. Asking a person who has recently been diagnosed with coronary heart disease about stress is sensitive, and raises questions of causality. Some authors compared people who had been diagnosed with an illness to a control group of individuals who had not been diagnosed, to test whether PSS played a role in the development of that illness.

Yen and Syme (1999) reviewed recent work at the intersection of sociology and epidemiology. They note that sociologists are engaged in the study of how variables like SES, Social Structures (racial segregation, income inequality, violence) affect health. They note that while epidemiology has done a good job of "identifying factors in the physical environment that are hazardous to health, similar work on the social environment is just beginning" (Yen and Syme 1999 p. 302). The authors suggest that now is the time for sociology to bring its work into the field of psychosocial stress. They acknowledge the importance of the work of Cassel and others in the 1970s, but conclude that research on social stress "has never really attracted strong and continued interest by epidemiologists (*ibid.* p. 303). In my opinion, stress research has also been overlooked by medical anthropologists, with the exception of biological anthropologists, and recently a handful of cultural anthropologists (*cf.*, James and Brown 1997, Lewis 1990, Schell 1997, Ulijaszek and Huss-Ashmore 1997, Dressler 1991, 1995, Oths 1991).

Social Support

We cannot ignore the fact that individual people respond to PSS in very different ways. The social resources that a person can mobilize when confronted with a stressor is usually measured in terms of social support. Social support is conceptualized as "the emotional, instrumental or financial aid that is obtained from one's social network" (Berkman 1983 p. 53). It is a concept that is difficult to operationalize. No matter how it is defined and measured, social support is consistently found to mediate between stressors and the stress response, as measured by health outcomes.

A Swedish study (Rosengren et al. 1993) followed 752 men born in 1933. At the beginning of the study the men were asked about stressful life events, their social networks, and basic demographic factors. Men who experienced more life change events were at increased risk of death in the seven-year follow up, although those with good emotional support were protected, and had a reduced mortality rate. A case-control study was done with chronic headache (migraine and tension-type) sufferers and two groups of controls (Martin and Theunissen 1993). No differences were found between the two groups in terms of stressful life events, but the headache sufferers scored lower on social support. A prospective study in Norway (Dalgard and Haheim 1998) found that social participation and locus of control were as important as social support in predicting mortality. The authors conclude that lifestyle and individual psychological resources are important psychosocial factors in overall mortality.

Another prospective study in the U.S. found that socially isolated men had higher risk of death from CVD, accidents and suicide (Kawachi et al. 1996). McLean et al. (1993) studied the effects of stress on pregnancy outcomes, and they explain that psychosocial stressors cannot be studied in a vacuum, "... since a woman's ability to

manage stressors may depend on her personal disposition, her psychological state, the composition and adequacy of her social network to provide support, failure to consider the interaction between these factors in an analysis of stress and adverse pregnancy outcomes may have led investigators to miss key causal relationships" (p. 52)

Active Coping

Sherman James developed the concept of John Henryism (JH) during research among black Americans, for whom John Henry, a legendary "steel-driving man," was a salient figure. James defines John Henryism as "a strong behavioral predisposition to cope actively with psychosocial environmental pressures" (James 1994 p.163). "The John Henryism hypothesis assumes that lower socioeconomic status individuals in general, and African Americans in particular, are routinely exposed to psychosocial stressors that require them to use considerable energy each day to manage the psychological stress generated by these conditions" (ibid p. 167). James recognizes that not everyone responds with the high effort coping his scale is measuring, only those who have this personality type. The John Henryism scale consists of 12 questions that ask respondents to reply using a 5-point Likert scale. The scale has been used in many communities in the U.S., as well as in Holland and Nigeria.

Dressler, Bindon, and Neggers (1998) used the JH scale in a small city in Alabama, and modified the five point Likert scale to a three-point scale (not at all true, somewhat true, and very true). They found that John Henryism was associated with increasing systolic blood pressure for men, but decreasing blood pressure for women. These findings correspond with other work by Dressler in the same community (1985) where active coping had opposite effects on blood pressure in men and women. The

effects of John Henryism vary by gender in this setting because of gender differences in work and family role, obstacles to success, racism, and demography.

Dressler's Research on Psychosocial Stress

Dressler has spent nearly 20 years studying psychosocial stress and health outcomes, primarily blood pressure. In the 1980s, he researched stress and coping (1985, 1986, 1987, 1990) in the black community of a small city in Alabama. Around the same time, he began a parallel research program in Brazil (Dressler, dos Santos and Viteri 1986, Dressler, dos Santos, Gallagher and Viteri 1987), again focused on stress, but its interaction with modernization. Dressler has continued to study stress and social support in Alabama (Dressler 1987, 1990, Dressler and Badger 1985), Brazil (Dressler, Balieiro and dos Santos 1997), Jamaica (Dressler, Grell, et al. 1988, 1995), and Mexico (Dressler, Mata, Chavez et al. 1986, 1987), and their effects on blood pressure, depression, and other health outcomes.

Dressler originally developed the concept of Social Status Incongruity (SSI) as a measure of PSS that contributes to blood pressure and depression. SSI hypothesized that a gap between a person's social status and the way the person lived his/her life, ("living beyond one's means"), would be stressful. Dressler used the SSI model in Brazil, Alabama, Mexico, and Samoa. These instruments were adapted and used in a comparative study of blood pressure in West Africa, the Caribbean, and a black community in Chicago (Cooper et al. 1997, Kaufman et al. 1996).

Beginning in 1995, Dressler modified his conception of PSS from social status incongruity to the study of cultural consonance. As described above, cultural consonance is closely tied to Cassel's proposal that being out of sync with one's own society is stressful. Rather than measuring a person's incongruity with his/her social status, Dressler

strives to evaluate a person's consonance (or dissonance) with his/her own culture's expectations/norms/standards.

Recently, Dressler has been working in the city of Riberão Preto (São Paulo state) in southern Brazil. There, he is comparing people from four different neighborhoods, each representing different socioeconomic strata. This research on cultural consonance and blood pressure is at the intersection of the modernization paradigm and the stress model (Dressler 2000a, 2000b, Dressler and dos Santos 2000).

Dressler considers his work as making three contributions to anthropology "culture theory, the developing bio-cultural synthesis and research methods" (Dressler 2000b p. 15). He uses a two-step approach to measure cultural consonance. He uses consensus analysis (described below) to create a group model of success, and then conducts a survey to determine how closely people's lives match this model (Dressler 1996). The greater the distance from the cultural model, the more stress a person is expected to experience. Other known predictors of blood pressure (e.g., age, obesity and dietary intake) are measured in order to isolate the variation that is explained by cultural consonance.

Cultural Consensus Modeling to Study Psychosocial Stress and Social Support

Cultural consensus modeling offers an alternative to using pre-formulated scales in the measurement of psychosocial stress. The researchers create cultural models unique to the group they are studying. The research I did in Beira, Mozambique was similar methodologically to Dressler's research in Brazil, but the models were created specifically for Beira. Even though they are unique to one place and time, the models are systematically constructed to test the general hypotheses that cultural dissonance is stressful, and that social support can buffer that stress. Therefore, the research done in

Mozambique can be compared to work in Brazil (or elsewhere) testing the same hypotheses, and even help to refine the theory.

The Roots of Consensus Modeling

Romney, Weller and Batchelder (1986) formalized the consensus model of culture. Boster (1986) and Weller (1983) had made observations about culture as consensus, and contributed to the development of the model. Since then, many others have refined the technique and added new dimensions to the original methodology (Batchelder and Romney 1988, Caulkins and Hyatt 1999, Caulkins 1998, Garro 1986, 1987, Handwerker 2002, Handwerker 1998, Romney, Batchelder and Weller 1987, Romney, Boyd, et al. 1996, Weller 1987, 1998, Weller and Romney 1988). CCM was originally designed for use with dichotomous data, but the model now accommodates multiple choice and rank-order data as well (Romney et al. 1987).

Romney (1989) traces the roots of CCM back to Spearman who, in 1904, wanted to test whether tests of intelligence were, in fact, measuring intelligence. Spearman compared the results of these measures to students' and teachers' rankings of other students. In a similar vein, Romney, Weller and Batchelder (1986) present data on a general information test, to which the answers were known. D'Andrade (1995) credits Boster's (1986) work with a variety of manioc plant names as the first to discover the power of consensus in a study of Jivaro women and varieties of manioc. Boster asked women to identify different kinds of manioc plants in an experimental garden he planted. He found that women who answered correctly were also more likely to give the same answers on a second trip through the garden. Women who gave more modal answers in the garden with easier types of plants also gave more modal answers in the garden with

the harder to identify plants. Boster knew *a priori* what the correct answers were, having planted the garden himself.

Critiques of Cultural Consensus Modeling

Robert Aunger (1999) criticizes cultural consensus modeling as a form of idealism. Aunger states that his target is idealism, but that CCM is the easiest representation of idealism to attack. He argues that culture is learned, and transmitted from one individual to another, yet idealism focuses on the shared nature of culture. CCM is, by implication of its association with idealism, also interested only in the shared aspect of culture. Aunger promotes a theory of realism, which emphasizes that culture is learned. In his reply to Aunger, Romney says that he believes that "culture is both shared and learned" (1999 p. S103), which I, and probably most anthropologists who use CCM, agree with. Aunger erroneously states that individuals are not compared to the group model to look at intra-cultural variation. CCM has been used to study intra-cultural variation, and several examples are discussed below.

Other critiques of CCM have focused on cultural competence, which describes how much an individual agrees with, or knows about, the group model of a domain. Individual competence levels are used to test whether there is consensus and to develop the group model. People who know more about a domain, (are more competent), also agree with each other more about that domain. More weight is given to the responses of people who agree with each other because people who "agree with each other about some items of cultural knowledge know more about the domain those items belong to (are more competent in that domain) than informants who disagree with each other" (Bernard 1995 p. 171). Additionally, indicators of cultural competence can back up a researcher's

intuition that some informants know more than others, and help to identify cultural experts in current or subsequent research (Johnson 1990).

The word "competence" is loaded and has hindered the acceptance of CCM by some anthropologists. They may consider it bad form to judge people as less competent or incompetent in their own culture. Many anthropologists are reluctant to admit that some informants know more about aspects of their culture than other informants, even though they rely on key informants. We all know, intuitively, that people who are specialists, for example herbalists, yoga masters, or biblical scholars know more about their area of study than other people. Cultural competence, as measured by CCM, does not imply that some informants are more competent in *all* aspects of culture, only in the domain being studied. In his review of the CCM, Bernard (1995) stresses the fact that informant competence is measured only "within specific cultural domains", it "is not a test of general competence, only of particular competence" (p. 171).

New terminology is one solution to this problem. I propose "culturally knowledgeable" or "domain specialist" to replace cultural competence. Others have suggested alternative terms. Hurwicz suggests the term "expertise" (1995, p. 234). Caulkins and Hyatt (1999 p. 24) proposed "cultural centrality" where there is agreement on a domain, or "knowledge" where there is not consensus. However we term it, anthropologists must acknowledge that some of our informants know more than others about specific domains, an assumption that has guided our use of key informants over the years.

Who Has Used CCM and What Have They Found?

Linda Garro studied intra-cultural variation in medical knowledge in Mexican curers and non-curers (1986) using CCM. She hypothesized that curers and non-curers

would either have 1) two different systems of medical beliefs, or 2) a similar belief system but with variation on how much they agreed with each other. She found the second pattern. In the visual representation of the two-dimensional scaling (p. 360) the curers are much more tightly clustered in the center of the plot of inter-informant similarities. Garro found consensus among the curers and the non-curers, but higher consensus among the former.

Garro also studied a group of Ojibway's beliefs about hypertension (1987). She combined CCM and other methods to construct an explanatory model of high blood pressure, as well as to look at variation around that model. Garro used two types of interviews; the explanatory model interview format developed by Kleinman (1980), and a series of 67 statements to which people were asked to respond true or false. Garro found a high degree of consensus around the causes and symptoms of hypertension in her sample of 26. From the interviews and the true-false data, Garro was able to construct an Ojibway consensus model for hypertension.

In addition, Garro (1987) identified two types of variation around the model. First, there is "informant disagreement with the "correct" response" (p. 113). These "informants simply reject some of the specific entailments of the key propositions (of the model) in order to be consistent with their own experiences" (*ibid.*). Garro breaks down the other variation into three sub-types, 1) people who hold an alternative causal model (e.g., heredity), 2) people who have a different explanation of hypertension but an explanation that is applicable to other illnesses (a curse, smoking, exposure to the cold), and 3) variation that is unexplained and considered particular to individual informants, idiosyncratic (catching hypertension from a blood transfusion, or eyestrain) (p. 114).

Garro's work on blood pressure is important because she used complementary methods to create a cultural model, and to examine the variation around that model. She also uses the model as a springboard to ask interesting questions; how this model might be related to other Ojibway models of disease, how such models develop, and how comparative work might be done if systematic questions with comparable responses were used. Garro includes her true-false statements about blood pressure in an appendix for other researchers to use or adapt.

Weller (1983) used a precursor to cultural consensus analysis to examine the hot/cold concept among rural and urban Guatemalan women. She expected to find consensus on which illnesses were hot and which were cold, and which required a hot or a cold remedy. Instead, she found a high degree of disagreement, within each group, and between the urban and the rural groups. Her conclusion was that the hot/cold classification system may exist in these communities, but that there is not a high consensus about what it means, or about what illnesses fall into one category or another. Her findings are in sharp contrast to the uniform picture of hot/cold classification painted by many medical anthropologists who work across Spanish speaking Latin America. Weller found a high level of consensus among her informants on the domain "*contagio*" of illnesses, indicating that the women she interviewed shared a cultural model of "contagious-ness", and understood what she was asking them. This research used CCM to show that there was not a shared cultural model of hot/cold illnesses, which had long been assumed by medical anthropologists working in Latin America. Weller has also used CCM to compare a folk belief, *empacho* (Weller et al. 1993), and factors

contributing to breast vs. bottle-feeding in different culture groups (Weller and Dugny 1986).

Hurwicz (1995) used consensus analysis to compare the belief systems of physicians who treat the elderly with the behavior of elderly patients. Specifically, she wanted to see if the two groups had similar ideas about what symptoms indicated that a visit to the doctor was necessary, and whether the elderly people's model guided their health-seeking behavior. She asked a group of 22 gerontologists to group 106 symptoms or conditions into one of three categories -- when a physician visit 1) not recommended, 2) recommended or 3) mandatory. The ratio of the first factor's eigen value to the second one was 5.66, which indicates a shared domain. Next, descriptions by 885 Medicare recipients of 2,493 illness episodes were analyzed to see if the elderly behaved and thought according to the model held by the physicians. Hurwicz concludes, "in the aggregate, they (the elderly) followed the same set of rules about the necessity of going to the doctor as physicians". Their behavior, however, "did not perfectly mirror biomedical norms." (p. 232).

Garcia and colleagues (1998) applied consensus analysis to the question of whether people of different age groups in a Mexican *barrio* of Guadalajara have different ideas about what causes hypertension. Thirty-five people were asked to freelist the causes of hypertension and their answers were compared by age groups (15-29, 30-49, and over 50). Thirteen items were selected and these were then ranked by a group of informants on how important they were in the development of hypertension. The freelist data showed high consensus for the group, but that intra-age group consensus was even higher. This intra-group variation continued with the ranking data, where the younger group ranked

obesity as the leading cause of hypertension, while the middle age group cited smoking and the oldest group cited anger as the most important.

Chavez et al. (1995) define intra-cultural variation as "how knowledge is systematically patterned within a culture" (p. 41). This group of researchers employed CCM to look at variation within the general category "Latinas", and asked whether there is sub-group variation in beliefs about risk factors for breast and cervical cancer. They looked at three groups of Latinas, 1) Chicanas who were born in the US of Mexican parents, 2) first generation immigrants from Mexico, and 3) El Salvador. They also interviewed a group of Anglo women and a group of physicians for comparison. Twenty-nine risk factors for breast cancer and 24 risk factors for cervical cancer were ranked by the women and doctors in order of their seriousness.

The research team found high intra-group consensus on the risk factors for breast cancer, and lower consensus for cervical cancer. Comparing the groups using MDS, the Anglo women were clustered closest to the physicians, the two immigrant groups also clustered close together, and the Chicanas were in between these two clusters, demonstrating their biculturalism. The authors conclude that "women with radically different views of risk factors for cancer are not necessarily presenting random, idiosyncratic misconceptions" (Chavez et al. 1995 p. 70), rather they are presenting a model held by other women like them. The two immigrant groups shared an understanding of cancer risk factors, it was simply a different one than the Anglos, physicians, or the Chicanas (Chavez et al. 2001).

Caulkins and Hyatt (1999) found that a re-analysis of previously collected data using CCM, and insights from thorough ethnographic research, shed new light on their

findings and showed them new patterns in their data. They caution that CCM does not always find agreement among respondents, but may reveal "non-coherent" domains.

Eight managers of a high technology firm were interviewed to see how closely they shared a common perspective on what the company needed to do to as it grew. Caulkins (1998) found low consensus among the managers, and concluded that the weak agreement was due to turbulence within the company and the larger industry. His careful ethnography of this company and other high tech companies helped him to understand the reasons behind the low consensus. Research on another firm also revealed low consensus among staff members on the role of the firm. Again, ethnography helped Caulkins to interpret the findings, concluding that this was a contested domain, rather than a pattern where two or more sub-populations were in disagreement. These three cases by Caulkins and Hyatt highlight the need for ethnography to accompany CCM, with the definition of domains, selection of the sample, and interpretation (and re-interpretation) of the findings.

Kempton, Boster and Hartley (1995) conducted a nation-wide survey of Americans' environmental values which was developed after semi-structured interviews with 40 key informants. The research is based on an understanding that "...people organize their culture's beliefs and values with what we call *mental models* or *cultural models*" (p. 10). Mental models are differentiated as being held by individuals, whereas cultural models are shared by a group. They continue "...agreement or disagreement about these cultural models often has a clear social *pattern of variation*,..." (ibid.). The researchers expected variation in beliefs and values about the environment by talking to five groups of people; from EarthFirst, the Sierra Club, "the public", dry cleaners, and

displaced sawmill workers. Instead, they found a strong consensus. When they broke the respondents down by groups, there was a stronger, more tightly clustered consensus of the members of EarthFirst and the Sierra Club. People in the other three groups agreed with these first two, but their answers were more dispersed.

Finally, as mentioned earlier in this chapter, Dressler has refined the concept of status incongruity into what he terms *cultural consonance*. Handwerker and Borgatti (1998) summarize how he uses CCM in studying cultural consonance, "Dressler has used consensus analysis to construct regionally and historically specific measures of poverty based not on the conventional and narrow biological conception of need, but on one more germane to understanding meaning and behavior – relative deprivation in lived experiences. The resulting measure of cultural consonance encompasses the lived experience of poverty with its multiple dimensions..." (p. 570). Dressler's own definition of cultural consonance is "...how closely an individual approximates in his or her own behavior the shared knowledge and understanding of his or her own society.." (2000b p. 2).

Dressler uses CCM to create local models of success and of social support. Even though the research includes four neighborhoods with sharply contrasting socioeconomic levels, a high degree of consensus for both models is consistently found. After creating these models, individuals are interviewed to find out how closely their lifestyle matches the ideal lifestyle, and how their use of social support matches the cultural model. Knowing what the ideal lifestyle is, but living a life that is very different, is considered stressful. The distance from the ideal lifestyle is conceptualized as a stressor. How well

an individual can access culturally appropriate social support indicates their ability to buffer themselves from life's stressors.

Dressler plans to use CCM model other aspects of Brazilian culture that might provoke or buffer against high blood pressure, as well as a model of Brazilian national identity. He uses three steps to the CCM process. Step one generates items in the domains, through open-ended key informant interviewing, freelist, and pile sorting. Step two consists of structured interviews to rate those items, and the ratings are indulged in the consensus analysis. Step three is where informants "describe their own behavior" to see how closely it approximates the prototypical behaviors in the cultural model.

Summary

Blood pressure in Africa is known to be caused by several risk factors, including age, obesity, and diet. Psychosocial stress is one risk factor for hypertension that has received little attention and its effects should be studied more carefully, in conjunction with other known risk factors. Learning more about the role of psychosocial stress will help to explain the increase of hypertension in urban settings in Africa, and may also make it possible to solve the puzzle of high rates of hypertension in African diaspora populations.

Research on psychosocial stress and health is only beginning to be done seriously, even though Scotch and Cassel planted the idea with their pioneering work 40 years ago. The tools we have developed to study PSS in western populations are often inadequate for research in non-western populations. Scales like the Stressful Life Events (Holmes and Rahe 1967, Miller and Rahe 1997), self-perceived stress (Cohen et al. 1983, 1995), and John Henryism (James 1994) scales, have been adapted to African settings with mixed results. We need to look for better tools to research psychosocial stress. One

alternative to using scales developed for other populations is to use standardized methods to create models that are specific to the study population. Cultural consensus modeling can be used to develop models of cultural consonance in lifestyle as one type of psychosocial stress. Similar methods can be used to develop a local model of social support and evaluate how it serves as a buffer against psychosocial stress.

CHAPTER 4 HYPOTHESES

Introduction

From the review of the published literature presented in the previous chapter, it is clear that more investigation is needed to understand the relationship between psychosocial stress and blood pressure. Psychosocial stress is often hypothesized to contribute to the development of hypertension in Africa, as well as in other parts of the world. Yet, only a handful of researchers have tried to assess the relative contribution of psychosocial stress to the development of hypertension in Africa. This study is an attempt to fill in this gap in our knowledge, using a systematic anthropological approach.

I chose cultural consensus modeling in this research to overcome the problems encountered when psychosocial stress is measured using standardized scales. Relying on a relatively small number of informants, I was able to construct models of lifestyle and social support that are salient to the population of Ponta Gea. I draw heavily on Dressler's theories and methods because his work addresses the issues of psychosocial stress, social support and blood pressure. He also uses systematic data collection techniques that yield culture-specific models. I applied Dressler's model and methods in Mozambique in order to test the model in an African setting and to contribute to our understanding of hypertension there.

There are however a few important differences between the context of Ponta Gea, Mozambique and Riberão Preto, Brazil that are relevant to the hypotheses. The correlation between socioeconomic status and blood pressure is negative in the Americas,

including the Caribbean, but negative in sub-Saharan Africa. Simply put, poor people in the Western Hemisphere have higher rates of hypertension, while richer Africans suffer from it more compared to poor Africans. Psychosocial stress associated with poverty has been hypothesized to be the reason for the former pattern. Public health researchers have pointed to lifestyle differences to explain the patterns observed in Africa. I wanted to know more about lifestyle, specifically what (if any) aspects of psychosocial stress were playing a role in hypertension in an urban African population.

In this dissertation, I tested a series of hypotheses on psychosocial stress and variation in blood pressure among urban men and women in Beira, Mozambique. After describing how I tested the hypotheses and presenting the results (in Chapters 5 and 6), I discuss how my findings contribute to the bigger picture in Chapter 7. In that chapter, I also outline the questions and methodological obstacles that remain.

To measure the role of psychosocial stress, I had to do two things. First, I had to measure other variables known to contribute to high blood pressure, such as obesity, age, and family history of hypertension. Obesity was measured using the Body Mass Index (BMI) which is calculated by $\text{weight (kg)}/\text{height}^2 \text{ (meters)}$. Age was measured by asking participants their age. Adult Mozambicans carry an identity card with their birth date printed on it, and in cases where people were unsure of their age, we consulted these cards. I asked each participant whether they had even been told they have *tensão alta*, as hypertension is commonly known in Mozambique. I asked if they knew of any family member who has (or had) *tensão alta*. If they said yes, we discussed which relative(s) had the condition and the interviewer wrote down their relationship to the participant. In

addition to these known risk factors, I also recorded participants' sex, ethnic group, income, occupation, education, and whether or not they smoked.

Second, I measured psychosocial stress in two very different ways to determine if the consequences for blood pressure were instrument dependent. The two scales were the Cohen Self-Perceived Stress Scale (Cohen 1983) and the Life Change Scale (Holmes and Rahe 1967, Miller and Rahe 1997).

Participants – adults living in the bairro of Ponta Gea – varied widely in terms of socioeconomic class and the length of time they have lived in the bairro or in the city, ranging from their entire lives to having just moved from another part of the city or from a rural area. People in the study are experiencing many of the same social, political, and economic changes present in Mozambique over the last several years. I expect that there is variation in the consequences of these events, in the amount of psychosocial stress that they bring to each person's life. In any situation there will be people who experience more stress than others. If psychosocial stress has an impact on blood pressure, I expect that the relationship will be measurable in this population. In the future, I plan to compare the data from Beira to data on psychosocial stress and blood pressure from African diaspora populations.

Phase One Hypotheses

In phase one I tested for consensus on what constitutes a successful lifestyle and social support. The models of lifestyle and social support are based on data from freelists of “what one needs in order to have a successful life” and ranking of the items in the list. I expected to find high consensus on these two models—that people share a common list of what constitutes an ideal lifestyle or social support network. As Dressler found in rural Alabama and urban Brazil (1990, 1995, Dressler and dos Santos 2000), this common

model of a successful lifestyle should include ownership of material goods and behavioral elements as well. Again, relying on results from prior research, I expected that the social support model in Ponta Gea would include substantial support from nonrelated people given the urban setting and the semimobile lifestyle of the population.

Phase Two Hypotheses

After developing the models in phase one, I conducted a survey of 261 adults in Ponta Gea to test whether variation in consonance with the models is associated with variation in blood pressure, controlling for other risk factors of blood pressure. In this phase, I was testing the following hypotheses:

1. Perceived stress varies positively with blood pressure.
2. Stressful life events within the past year predict higher blood pressure, and conversely a lower number of stressful life events in the past year will predict lower blood pressure.
3. Blood pressure increases with known biological cofactors, such as age, body mass index, and family history of hypertension.
4. Income, education, and degree of urbanization all vary positively with blood pressure.
5. *Ceteris paribus*, ability to access culturally appropriate social support buffers people against stressors and thus varies inversely with blood pressure.
6. *Ceteris paribus*, consonance with the shared lifestyle model varies positively with blood pressure: high consonance predicts high blood pressure,

CHAPTER 5 PHASE ONE: ETHNOGRAPHY

Consensus Modeling: Reprise

I used consensus modeling, (described in Chapter 3), to discover the shared cultural models of lifestyle and social support in Ponta Gea. This chapter describes the techniques I employed to build these models, and how individual variation around them will be studied in the model-testing phase (two). The building of shared cultural models is useful in two ways: to describe one aspect of a society, and to create a model as a tool to study variation around it.

I chose cultural consensus modeling (CCM) to explore intracultural variation in blood pressure. In phase two, I tested whether an individual's distance from a cultural model is stressful for that person, and whether that stress is buffered by the person's access to social support. As discussed above, it may seem contradictory to use a consensus model to study variation, but it makes sense. I first developed a group-specific model using CCM, and measured how much individuals' lives vary from that model.

Anthropologists cannot ignore the variation that exists within groups they study, and CCM is a powerful way to measure this variation systematically. Dressler (2000a) describes the specific methods he uses to create a group-level model, and how he then studies patterns of variation from the model. The cultural models are specific to the group of people being studied at a particular time, but the systematic way of constructing these models means that we can compare the results to other groups, or in the same group across time.

The rich ethnographic aspect of cultural consensus modeling may be lost in the formality of the method. CCM involves systematic data collection – lists, for example – but it also involves traditional ethnography – participating in the everyday life of a community, observing social interactions, engaging in conversations and discussions, and finding members of the community who have a special capacity to explain comments and behaviors that are novel or seemingly inconsistent. This experience gives the ethnographer insight into the context of a model and the forces that have shaped it, and is invaluable in the interpretation of how people's lives vary from the shared model.

Methods Used in Phase One

Preliminary Steps

Learning the city

The research in Beira began in October 2000. During our search for a house, I became familiar with the layout of the city; primarily the cement city, where houses are European style, made of wood, cement, and tile. The rest of Beira is referred to as the reed city because the housing is constructed from local, mostly degradable, materials. The cement city consists of the downtown (the *baixa*), the port and industrial area, and three residential areas, Palmeiras, Macuti, and Ponta Gea.

Site selection

The neighborhood of Ponta Gea was selected for the research project for two reasons. First, the residents represent a broad cross-section of socioeconomic and educational levels, even though it was one of the most exclusive neighborhoods in Beira during colonial times. Since the departure of the Portuguese in 1975, the neighborhood has become home to a wide range of people. Following independence, private property

was nationalized, and "...housing vacated by returning [fleeing] Portuguese was assigned to homeless families, and rents were collected by the state." (Nelson 1984 p. 204).

Second, of the three residential areas in the cement city, Ponta Gea is the least purely residential and the most dynamic. In U.S. terms it would be considered a mixed zoning area. Portuguese planners (in 1939) envisioned the European part of the city divided into the downtown and two residential sectors (Empresa Moderna 1951). The western residential sector [today Ponta Gea] would have "large houses built together [along] with a commercial area, establishing a transition between the two zones [downtown and the Palmeriras/Macuti], with a higher population density, but without sacrificing standards of cleanliness." (ibid p.138). Ponta Gea borders the downtown and port areas, the main road connecting the cement city cuts through it, and it is home to several large and small businesses, two university campuses, government offices, restaurants and clubs, a dozen churches, and the Mayor's residence. According to many residents of Beira I spoke to, Ponta Gea is not like the other upscale residential areas of Palmeriras and Macuti, which are considered sleepy, aloof, and inaccessible. One interviewee gave his taxonomy of the neighborhoods of Beira, in terms of exclusivity: first tier--Palmeiras and Macuti, second tier--Ponta Gea and the downtown, third tier--the reed city.

Many inhabitants of Ponta Gea live in spacious homes, (some of which have been subdivided), while others live in garages, apartment buildings (ranging from 4-80 units), or in *dependencias* (outbuildings at the back of a property, usually built as servant's quarters). In early November 2000, my husband and I took up residence in a rented house in Ponta Gea. Our home was typical of one style common to the neighborhood; in

addition to the main part of the house, it had an attached three-room apartment, and a detached one-room *dependencia* along the back wall of the property. The owner had been given the house by the government in the 1980s, and he preferred to rent it for foreign currency, while living with his family in a nearby apartment he also owned.

A map of Ponta Gea and legend is found in Appendix A.

University contacts in Beira

I contacted the two universities in Beira, the Catholic University of Mozambique (UCM) and the Pedagogical University (UP) (these are described in Chapter 2). I had met the President and the director of research of UCM during my predissertation visit to Beira in August of 1999. In October 2001, I renewed these contacts, described my research project, and met the members of the new medical faculty. I found that the people from the medical faculty and the Center for Investigation and Integrated Development (CIDI) at UCM had the most helpful input for the project. At the UP, my contacts were primarily through the geography faculty, which includes the disciplines of anthropology, sociology, and social and physical geography. Here, I benefited from the presence of several Mozambican social scientists who were willing to advise me during and after the study.

In September 2001, I presented the preliminary results of the research project to the Medical School at the Catholic University. Faculty, staff, and students at the Catholic University participated in the semistructured interviews, cognitive data collection, and informal interviews. Toward the end of my stay in Beira, I gave a lecture to an introductory anthropology class at the UP. Because of the proximity of the UP in Ponta Gea, I could rely on students, faculty, and staff for assistance in the pretest stage of the questionnaire. I also turned to these people for additional informal interviews throughout both phases of the research.

Language study

I took private language classes with a Portuguese professor at the Catholic University from October 2000 through February 2001. We used materials for instruction of Portuguese as a second language, or Portuguese for foreigners. My research funding included monies for studying both Portuguese and local language. In his discussion of the skills needed for effective participant observation, Bernard states, "the most important thing you can do to stop being a freak is to speak the language of the people you are studying – and speak it well." (2002 p. 339). I already spoke Portuguese, but the language classes helped me to speak it well. I had previously studied Portuguese in Angola, at the University of Florida, and at Eduardo Mondlane University in Maputo during my predissertation visit.

In Beira, I also studied Nda, one of the two most common local languages. The academic dean of economics at the Catholic University recommended two students who were Nda speakers and had experience teaching it. I interviewed them and selected one as my teacher. He had previously taught Nda to foreign missionaries and Mozambican church members who needed to improve their skills to participate in services. We obtained study materials from a Catholic priest who is a specialist in linguistics. I studied Nda in the hope that I would be able to follow interviews if they had to be conducted by my research assistants in Nda or Sena. This turned out to not be necessary, since we conducted just three interviews in a language other than Portuguese: one in Sena, one in Nda, and one in Shangane.

Formal Data Collection

I collected systematic data on the local models of a successful lifestyle and social support using a mix of semistructured interviews, participant observation, and cognitive

techniques (freelists, ranking). I also participated in a small research project on blood pressure by the Catholic university, using participants from the Pedagogical University.

Semistructured interviews

During phase one I did 12 semistructured interviews with seven men and five women. See Table 5-1 for characteristics of the interviewees. The interviews covered various aspects of three general topics:

- what constitutes a successful lifestyle
- types of social support and circumstances when social support is needed
- the folk illness *tensão alta* (causes, symptoms, and treatment).

During the semistructured interviews I collected two freelists of 1) the elements of a successful lifestyle and 2) categories of people who constitute the informant's social support network. In addition, people were asked to talk about how lifestyle and social support have changed in recent years, give an overall assessment of both topics, and suggest scenarios in which they would seek out social support. The interviews also covered the folk illness *tensão alta* (TA). The findings on TA are discussed at the end of this chapter.

Table 5-1. Characteristics of the Interviewees.

#	Sex	Age approx.)	Occupation	Interview site
1	Male	Early 30s	Clerk (trained as electrician)	Work
2	Female	Early 50s	Teacher	Home
3	Male	Early 60s	Researcher	Restaurant
4	Male	Late 30s	Mechanic	Restaurant
5	Male	Early 40s	Agriculture Project Manager	Work
6	Female	Late 30s	Store Manager	Work
7	Female	Early 40s	Health Project Manager	Work
8	Male	Late 20s	Radio DJ	Work
9	Male	Late 50s	Pastor	Home
10	Male	Late 20s	Student	School
11	Female	Late 20s	Student	School
12	Female	Late 40s	Dental Assistant	Home

The interviews were conducted in the person's home or workplace, or at a restaurant. The informants were chosen because of their special knowledge about life in Beira. A convenience sample was drawn from a pool of people whom I, or someone else, identified as having a special knowledge about life in Beira. They were selected to represent a cross-section of age groups and socioeconomic levels. All were of African descent except for interviewee #2 who was of Indian descent.

I took notes during the interviews and typed them up the same day in order to reduce error in recall (Bernard 2002). I did not tape record these interviews. In my experience in Mozambique, the majority of the people did not want to be tape-recorded. During my predissertation visit to Mozambique, I watched other foreign researchers tape record interviews, and saw that they had little success. I asked my colleagues at Eduardo Mondlane University for their opinions on taping interviews. The consensus was that tape recording was not well accepted, and suggested I ask interviewees what would they prefer. During a previous stay in Maputo (February - June 2000), I interviewed several people. I asked them whether they preferred that I to take notes or record our interview, and they all opted for note taking. I asked the first few interviewees in Beira for their preference, and they too uniformly preferred to not use the tape recorder.

Key informant interviews

I also conducted semistructured interviews with key informants during this phase of the research. I interviewed one doctor from the Beira Central Hospital. I chose her after asking several doctors in Beira to tell me which physician treated the majority of patients suffering from hypertension or heart disease. During my interview with her, we discussed the characteristics of hypertension patients, their treatment options, and problems with adherence with treatment. I also spoke at length with the following

physicians; The Director of the Provincial Health Department, the Director of the Ponta Gea Health Center, and the Medical Director of the Ponta Gea Health Center. We discussed the frequency of hypertension in Beira, its causes, treatment issues, and the cases of individual patients. After describing my research project to each of them, I solicited their feedback on the study. With the two doctors from the Ponta Gea Health Center, I made a plan to refer study participants for follow-up care if they had elevated blood pressure.

Other key informant interviews included a traditional healer, a pastor, a sociologist and our landlord, (a well-known and respected man in Ponta Gea). In these interviews, I asked people to tell me about the problems people encountered in everyday life, how they dealt with them, stress, social support, and *tensão alta* (TA). I used the term *tensão alta* (in Portuguese), rather than *hipertensão* (hypertension), for two reasons. It is more commonly used and understood, and people clearly identify TA as a stress-related illness. The interview with the traditional healer focused on her treatment of TA, while the pastor spoke mostly about changing lifestyles, differences between urban and rural life, and the role of the church in an urban setting.

Our housekeeper was a great source of information about the themes I was studying. She and I had daily conversations about happenings in Ponta Gea, her life and friends, and events related to people we knew in common. I often asked her to explain things I had observed, or topics mentioned in conversations, that I did not understand. We went shopping together, discussed religion and healing, marriage, children, food, and war. She was raised in a family who moved around the country while she was growing

up, never went to school, married twice, had four sons, lost two husbands, and spent years working in a government garment factory.

My Portuguese and Ndau language teachers were also key informants with whom I discussed my research. From them I learned about lifestyle, stress, social support, and high blood pressure among their neighbors and friends in Beira, and in their own lives. My Portuguese teacher suffers from hypertension and takes medication to control it. My Ndau teacher told me about the Ndau concepts of blood, its circulation in the body, the heart, and what happens to the blood and heart when people become angry, afraid or worried. I built up good rapport with these teachers, and they provided different, yet valuable, perspectives on the connection between stress and blood pressure.

Participant observation

I participated in the routine life of a resident of Ponta Gea, buying bread at the corner bakery, fruit at various corner stands, and other produce at the neighborhood's open-air market. I walked our dog regularly in the neighborhood, stopping often to chat with children and adults. I traveled on local transportation, (*chappas*, independent vans that ran on regular routes), walked, and rode a bicycle in the area. One of the women I interviewed became my tailor, and another our supplier of nutritional supplements. One interviewee told me he was a retired electrician, and later did electrical work for us at the house. I also attended the Beira chapter of the Rotary club, and was a volunteer at the Beira Central Hospital on behalf of the Beira Women's club.

I took every opportunity to steer casual conversations with friends and acquaintances toward stress and lifestyle in Beira, and to follow up on every mention of illness, especially when *tensão alta* (TA) was mentioned. I often asked people directly whether they knew someone who had TA, or who could help out when people had

problems, in order to start a conversation about stress or the local model of social support.

I recorded my participant observations in the community in a computer file of field notes throughout the year in Beira. The majority of the notations are about themes related to health, stress, healing, lifestyle and social support, although there are also notes on routine community events and important events. I did not take notes during most casual conversations because it would have inhibited the rapport and flow of ideas. Everyone I spoke with knew that I was doing research on lifestyle, stress, and high blood pressure, and that their conversations with me were helping me to understand how people lived and were sick in Beira. I typed up these conversations within a day or two to remind myself of their topic and content.

Pilot study at the *Universidade Pedagógica*

Soon after arriving in Beira I met with the Dean of Medical Education at UCM. Dr. Elias told me that the first year medical students had recently done a practical exercise using the students and staff at UCM, which included measuring blood pressure. He said they were planning to organize a similar exercise on their next break between classes. I suggested they contact the UP and ask the students and staff there to participate. On November 13, 2000, the medical students from UCM measured the blood pressure, height, and weight, and collected other information on 311 people affiliated with the UP. In November and December I helped to enter, clean, and analyze this data, and wrote a short report on the findings. Fifty people (16%) in this sample had blood pressure values greater than 140mmHg systolic or 90mmHg diastolic, the cut-points for high blood pressure (WHO/ISH 1999).

Four months later, I visited the UP, along with a professor from the medical faculty at UCM, to remeasure the blood pressure of these 50 people. Twenty-five of the 50 people who were invited to come the second time came to be remeasured, all men. Seventeen of the 25 repeat participants had high measurements during the second visit. During the same visit, I measured the blood pressure of 40 other students and faculty who came because they heard that we were there and were interested in knowing their blood pressure.

This pilot project revealed a few patterns of high blood pressure in this population, but more importantly, it showed me that people in this community are very interested in having their blood pressure measured. I used the follow-up visit to the UP to pretest a Portuguese translation of the John Henry scale (James 1996), and to look for an association between scores on that scale with blood pressure. Fifty-five people completed the John Henry 12-point scale in addition to having their blood pressure measured. The John Henryism results are discussed in the last section of this chapter, on finalizing the questionnaire.

Freelisting

I collected two types of freelists in phase one; the elements of ideal lifestyle, and categories of people who make up social support networks. As described above, the 12 people who participated in the semistructured interviews each provided the two freelists.

Ten additional freelists on lifestyle and social support were collected from a convenience sample of five men and five women (these were different people than the previous interviewees), to make sure that I had the most complete list of lifestyle and social support items possible. The majority of the ten people who provided the ten additional freelists were students at the Catholic University who come from middle and

upper class families in Beira. I could have stopped after the original 12 freelists done as part of the interviews, because they provided me with all of the final list of items that were included in the model used in phase two. A total of 44 freelists were collected, 22 on lifestyle and 22 on social support, from 22 different people.

The questions used to elicit the freelists were the same for people who provided a list in the course of an interview, and for the additional ten people who only provided the freelist but were not interviewed. To elicit a list of lifestyle items, participants were asked "What are the elements of the lifestyle of a successful person?" As a prompt, I asked, "How do these people live, what do they do, what do they have?".

To elicit categories of people involved in social support, I asked "Who can you turn to when you need help?". In response, many of the informants asked for clarification, "What kind of help?". I used this opportunity to ask them to first list scenarios of when they (or people they knew) needed to seek assistance for a problem. After they had done this, I asked them to list people who can help out during these scenarios.

Ranking

After compiling and analyzing the freelist data, I had 12 people (different people from the people who had freelisted), rank 41 lifestyle items in order of importance. They were given a set of 3 x 5 inch file cards with the name of each item written in Portuguese. The cards were shuffled after each person completed the ranking exercise. Three other file cards had three category names written on them; not important, important, and very important. People were asked to sort the 41 cards with the lifestyle items into the three categories first. Once they had done this, I asked them to rank the cards in order of

importance within each category. I asked people to use two steps in order to make the task easier for them, and to collect both rating and ranking data.

Freelist and Rankings Findings

Lifestyle

The 22 freelists for lifestyle items yielded more than 100 individual items. Individual lists ranged from eight to 21 items. After like items were consolidated, there were 98 items, of which 48 were listed more than once. The full list of items is in Appendix B.

From all of the items that were freelisted, I selected 41 items (in Table 5-2) for the ranking exercise. I excluded the 50 items that were mentioned just once, and, after discussions with key informants and several of the listing participants, eight items that were mentioned more than once.

I did not include "have a mistress" because this is only expected of men, not of women. I took out "have enough food" because this would be a subjective assessment and could be biased by the mood the person is in at the moment of the interview. I did not include "not lack" in the ranking exercise because it was too vague a concept and could not be adequately measured in the survey phase. I also did not include bicycle because riding a bicycle is clearly not something that a successful person does, and it was unclear whether the people freelisting had intended to mean that the successful person buys a bicycle for his or her children.

The other four other items mentioned more than once were items that were collapsed into broader categories. For example, participants mentioned "sponsor a soccer team", or "build a school", or "help out people who don't have as much." I included these

items under the label "philanthropy," which was also mentioned several times but not included in the ranking.

I included "have a spouse," even though it was mentioned once because during the interviews most people discussed the successful lifestyle assuming that the person was married. I knew from participant observation and conversations that having a spouse was an important part of life in Ponta Gea and should be included in the ranking exercise.

Table 5-2: Average Score for the Items that were Ranked.

	Lifestyle item in ranking exercise	Score
1	Own a home *	3.73
2	Spouse (be married) *	7.73
3	Access to private health care *	8.12
4	Good job	11.51
5	Electricity *	11.84
6	Running water *	12.13
7	Have enough money	13.66
8	Car *	14.71
9	Speak Portuguese at home *	15.83
10	Have housekeeper *	16.13
11	Driver's license *	17.84
12	Water tank *	18.07
13	Home telephone *	18.19
14	Speak a some English *	18.25
15	Have maximum three children	18.34
16	Air conditioning *	18.50
17	Refrigerator *	19.37
18	Send children to private schools *	20.44
19	Freezer *	20.45
20	Eat out in restaurants *	21.82
21	Television *	21.83
22	Stereo (with cassette tape player) *	22.33
23	Stove (w/oven, not a hotplate) *	22.52
24	Satellite TV *	22.78
25	School material for children	23.14
26	Cellular telephone *	24.14
27	Spend holidays outside Beira *	24.36
28	Video player *	24.58
29	Have a stable life	24.85
30	New clothes for your children	25.08

Table 5-2 continued

	Lifestyle item in ranking exercise	Score
31	Furniture set	25.10
32	Computer / Internet	25.49
33	Water pump	25.58
34	Have multiple sources of income	25.84
35	Generator	26.14
36	Not have any worries	27.52
37	Washing machine	27.93
38	Invite your friends over	27.97
39	Carpet on the floor	34.67
40	Serve high quality drinks	35.75
41	Shop in luxury stores	36.75

The score in the right column was generated by Anthropac (Borgatti 1992), using the ranking data in the consensus function. This program names this output as the correct answer. It is the average rank given to the item by the 12 people. The items marked by an asterisk were included in the phase two survey.

Analysis of the ranking data from 12 respondents showed high agreement (respondent reliability = 0.858) using the consensus function. Table 5-3 shows that the ratio of the first eigenvalue to the second is greater than three, an indication of consensus. Though 12 respondents is a small number, there were no negative loadings on the first factor and the mean knowledge score was 0.58 (range .29–.80), standard deviation was 0.15.

Table 5-3 Eigen values

Factor	Value	Percent	Cum %	Ratio
1	4.288	69.4	69.4	3.603
2	1.190	19.3	88.6	1.692
3	0.703	11.4	100.0	
	6.182	100.0		

Based on the results of the rankings, 24 items were included in the questionnaire to measure lifestyle. I included items that scored higher than 25 in the consensus analysis, with the exception of five items. I excluded "have three children or less" because many

people in the study are still having children. Likewise, I excluded “buy school materials for the children” because it would only apply to people with children of school age, plus I thought that I would find little variation among people who do have school-aged children. A family that has children attending school will do everything necessary to insure that the child has a backpack, pencils and copybooks, all of which are readily available and considered essential. The copybooks are all the same, but the real variation occurs in the cost and quality of the backpacks, which would be very difficult to assess.

I also excluded three items that would have been too subjective and could have easily been influenced by the person’s mood and events on the day of the interview. I could not define “have enough money”, “have a stable life” and “have a good job” in a standardized way. Nor could I expect people to share the same definition of what each concept means as I could expect them to share the definition of having a spouse or not, or speaking Portuguese at home or not.

Table 5-4 Lifestyle Elements Included in the Phase Two Questionnaire.

Thing people Do:	1. Send children to private schools
	2. Access to private medical care
	3. Speak Portuguese at home
	4. Speak some English
	5. Obtain a driver’s license
	6. Spend holidays outside Beira
	7. Have a housekeeper
	8. Eat out at restaurants
	9. Have a partner/spouse
Things People Have:	10. Car
	11. Home
	12. TV
	13. VCR
	14. Running water
	15. Water Tank
	16. Electricity
	17. Telephone
	18. Cell phone
	19. Satellite TV

Table 5-4 continued.

Things People Have:	20. Sound system
	21. Stove
	22. Fridge
	23. Freezer
	24. Air Conditioning

Social Support

The 22 freelists of social support included substantially fewer items than the lifestyle lists. Respondents mentioned 22 categories of people who provide social support. Of these, 14 categories were listed by more than one person. Table 5-5 shows the complete list of items.

Table 5-5. People Who Can Provide Social Support.

(From 22 freelists)	# of listings	Resp. Percent	Average Rank	Smith's Score
Friends	17	77	3.118	0.45
<i>Padrinhos</i> (godparents)	11	50	3.273	0.281
Family	9	86	1.789	0.719
Church/Mosque member	9	41	3.333	0.243
Neighbor	7	32	4	0.126
Employer/boss	6	27	3.5	0.133
Spouse	6	27	2.5	0.204
Court	5	23	4	0.106
Priest/Pastor	4	18	4.75	0.069
Coworker	4	18	5	0.061
<i>Conterraneos</i> ("same land")	2	9	2	0.073
Government	2	9	3.5	0.055
Schoolmate	2	9	4	0.052
Police	2	9	2	0.078
<i>Regulo</i> (traditional leader)	1	5	5	0.019
Doctor	1	5	3	0.015
<i>Curandeiro</i> (trad. Doctor)	1	5	6	0.013
Teacher	1	5	4	0.026
My spiritual guide	1	5	1	0.045
Psychologist	1	5	3	0.023
Foreign businessmen friends	1	5	5	0.009
<i>Mulheide</i> (woman's group)	1	5	1	0.045

Categories of people who provide social support selected for the questionnaire:

1. Family members
2. Padrinhos (godparents)
3. People at your church or mosque
4. Close friend
5. Neighbors
6. Boss
7. Colleagues (coworkers /schoolmates)
8. People from your home region (*conterraneos*)

I combined spouse into the category of family; priest, pastor or church member into "people at your church or mosque;" and coworker and schoolmates into colleagues because the same word in Portuguese (*colega*) is used to refer to both.

During the phase two survey, participants told us they would turn to people or institutions not included in these eight categories. So, during the coding of the social support data, we added the category of bank and government agency to the list above. The latter category included courts, the Mozambique Women's Organization (government), and neighborhood leaders.

The following scenarios [when social support is needed] were collected during the interviews and freelisting exercises.

1. When you are sick.
2. When a family member is sick.
3. If your child is taking drugs.
4. If your son gets his girlfriend pregnant.
5. Conflict within a couple.
6. If you need to borrow money.
7. When someone dies.
8. During the floods.
9. If your child drops out of school.
10. If your children are acting badly.
11. When there is conflict at work.

Defining a shared model of social support. Based on the interviews, as well as discussions with my research assistants and university colleagues, I chose five scenarios

where a person needs to seek out social support to include in the survey questionnaire. The scenarios had to be generic enough to apply to all the interviewees' lives. We found out later that many people did not have jobs with coworkers or attend school, so they did not give an answer to scenario four.

Once the scenarios had been selected, I discussed with ten informants who would be the best category of social support for each one. They were read the scenario and then asked to say who would be the best person to turn to for help in that situation. They were then asked, "If that person is not available to help, who is the second best choice to turn to for help in this situation?", and so on, until they said that we had exhausted the categories of people appropriate for the given scenario.

Scenarios adopted for the questionnaire:

1. When you need to borrow money.
2. If a family member is sick.
3. In case of conflict with your partner (within the family).
4. To solve problems at work or at school.
5. The death of a family member.

For scenario 1, (borrowing money), the most common response was boss/work. Many employers will give a salary advance to an employee who has a family crisis. A few of the informants mentioned that if an individual does not have family members living in Beira, or if their family was poor, then getting money from an employer was the best option. Second choice was to borrow money from a family member, one who has the means to give a loan. Usually, this means someone who works and has a steady income. Close friends can also be approached for a loan, as can *padrinhos*, if the couple is particularly close to them. If a person has no kin or close friends living in town, then a *conterraneo* can be asked to give financial support. Neighbor is not an appropriate

category of person to ask for a loan, and no one mentioned colleagues or fellow church/mosque members.

When a family member is sick (scenario 2), the first option given was to ask other family members for assistance, taking the person to the hospital, or caring for them at home or in the hospital. If transportation is needed for medical care and the family has no car, then a neighbor with a car is usually approached. In addition to providing transport, neighbors will also come to visit the sick person. Friends can also be counted on for emotional support, visits, and food, as can colleagues or *padrinhos*. Church or mosque members will often come visit a sick person at home or in the hospital. Many churches have organized groups of people (usually women) who have the job of visiting the sick members.

When a couple has problems (scenario 3), the first resort is to the *padrinhos*, especially if they live in town. When couples do not live geographically close to their *padrinhos*, or do not feel emotionally close to them, they may turn to a close friend or family member who they feel close to. If a problem escalates, then a family conference may be called. In Beira, most people come from a patrilineal background, in which case the husband's family would be called first. If the situation worsens, then both sides of the family are called together to discuss a solution. Church members or pastors/priests are also seen as good people to give advice to couples who are having problems.

To resolve a problem with a coworker or schoolmate (*colega*), most informants felt that the most appropriate place to seek advice was from a family member, close friend or family member, in that order. The most frequently mentioned family member

was spouse. Less frequently mentioned options were church member or *padrinho*, and only one (of ten) people mentioned boss.

In case of a death in the family (scenario 5), all eight categories of people who give social support were mentioned, and most respondents noted that help comes from all sides during this time. Family members are the first line of support, and they provide financial, moral and logistical assistance. Employers often provide transportation to the burial, as well as financial help. Churches and mosques also provide transportation, along with moral support. Neighbors and friends come over to sit with the family, as do coworkers/schoolmates, and *conterraneos*. Food is usually provided by family, neighbors and friends. *Colegas* contribute financially as well as giving moral (emotional) support.

Discussion of the Findings

The research in phase one yielded a rich description of life in Ponta Gea, and provided insights into what type of lifestyle is valued, how a successful life is lived, recent changes in social support norms, and what kinds of social support are valued for different situations. Because of the nature of the topics covered in the interviews, the transcripts also provide a window into the concept of stress, and how people deal with stressors in their lives. The semistructured interviews also covered the folk illness of *tensão alta*, which is discussed below.

Lifestyle

The shared model of lifestyle in Ponta Gea was developed during phase one. Data came from 12 semistructured interviews, ten people who just did free lists, 12 different people who ranked the lifestyle items in order of importance, key informant interviews, and participant observation in the neighborhood.

The ideal lifestyle involves assimilation to the culture of the colonial rulers, including fluent use of Portuguese. It also involves having the financial resources to deal with uncertainty and change and conspicuous consumption. There are clear gender differences, as well. I discuss these in turn.

Connections to the colonial period

During the semistructured interviews, several of the respondents compared the successful lifestyle to the *assimilado* lifestyle as defined by the Portuguese during the colonial period. One older man said, "The life of an *assimilado* is what is sought out today. Use a fork and knife, and don't eat with your hands. Be Catholic, live in a cement house, speak Portuguese and adopt Portuguese culture." (interview 3). During colonial times, *assimilados* were allowed to live in the areas of town reserved for whites only, and were closely associated with the Portuguese colonial authorities (Newitt 1995). Other informants mentioned the importance of living in the cement city, speaking Portuguese, formal education, and having a "western" style of life. The *assimilado* lifestyle is clearly the foundation of the shared model of lifestyle in Ponta Gea.

Contract laborers from central Mozambique were recruited to work in Rhodesia (Zimbabwe) and South Africa during colonial times. These men were expected to acquire certain material possessions before returning home. A worker who completed his term and returned to Mozambique without a suit, watch, gramophone, and bicycle was looked down upon because he had obviously squandered his wages on alcohol or women. If he did bring these items back, (and even signed another contract to earn more and buy more), he was accorded prestige for being a hard worker and frugal with his earnings. The specific possessions a person has to own to be accorded that prestige had changed by 2001, e.g., a car instead of a bicycle, or stereo instead of gramophone. What has not

changed is the expectation that a person who has worked hard, saved money, and traveled outside the country, will own high prestige items. One of the principal markers of being *assimilado* is fluency in Portuguese and, today this increasingly extends to knowledge of English.

Language use is related to status in Beira and across Mozambique. School children often refuse to respond to relatives who address them in the local language in public settings so as not to be embarrassed in front of their friends. The ability to speak Portuguese well indicates formal schooling, and also opens up a connection to the rest of the world. While talking about high status people, one older woman remarked, "They speak Portuguese in their home because they are more evolved and don't want to speak the local language. Their kids don't even speak their own language. The problem is one of colonization. You used to have to speak Portuguese to study in the state sponsored schools." (interview 7). Fluent use of the Portuguese language was one of the requirements to gaining *assimilado* status.

The relationship between language use and status is reported to be different in the center of Mozambique than in the south. In the center there is not one dominant local language—both Sena and Ndau are widely spoken. In addition, people from across the country have moved there for economic opportunities or to flee the civil war, bringing with them their own languages. Portuguese serves as a *lingua franca*. Several interviewees told me that local languages are more widely spoken in the southern part of the country. "The people in the south speak more Shangane, but here in the center we speak more Portuguese." (interview 3). Interviewee #4 stated, "In the center and north of the country people speak more Portuguese. In the south they use the local languages

more." Other informants stressed the importance of knowing one's local language as a way to preserve cultural ties and enable good communication with older relatives.

English is rapidly becoming the language of choice in Mozambique, a country bordered by five English-speaking countries. "The TV has made English popular, but mostly for the younger population. They all want to learn [it]. The older people don't really think about learning English, it was never emphasized for them. Now it's too late!" (interview 1). An informant who can speak English well, and uses it at work, said, "People use English to make a good impression. You can go anywhere with it. A lot of people use it just to show that they have a higher level than other people." (interview 4).

Gender differences

There are sharp differences in expectations of behavior between successful men and women. Men are expected to go out to bars and chase young girls, referred to as *catorzinhas* (literally "little fourteen year olds"). Having a steady, (younger) beautiful girlfriend is a visible sign that a man has plenty of money. Interviewee #5 made a connection between the practice of polygyny in traditional rural life and the taking of lovers outside marriage in an urban setting, "Now they cannot have more than one official wife, but they still have others (women), and the first wife has to accept it." Having a mistress was mentioned four times in the 22 freelists but was not included in the model.

A successful man is expected to spend a lot on buying his mistress nice clothes and jewelry, thus keeping her happy. "You have to have a girlfriend to show off to everyone. It's stylish and necessary to have one." (interview 4). This behavior is recognized to have a negative effect on the man's wife and family. "But then they don't leave any money at home. They take all the money and don't leave any for the family."

(interview 4). "A lot of men arrange a girlfriend, and pay nice things for her, and then there is less money for the family." (interview 11). If a man leaves too little money for the basic expenses, his wife is then supposed to make ends meet and somehow provide food for the family and other household members for the day or weekend.

In the interviews, when I asked "tell me how does a successful person live?" almost all the respondents replied with a description of how a successful man lived. The word in Portuguese for person (*pessoa*) is feminine, but in most of the responses, the masculine form was used, which is the default gender in Portuguese. Sometimes I asked, as a follow-up question, "And, what about successful women, is it the same for them?". One person said, "The women like to buy nice clothes with good labels and dress very nicely with nice jewelry" (interview 1).

Several interviewees described women as having a different constitution than men, and having a more isolated life in general. Women are seen as weak and controlled by their emotions, always complaining, and with no way to release their frustration or anger. Interviewee #5 said that women "they have less recreation, and they have a heavier *carga* (burden). They have more responsibilities at home, and some also have jobs". Another person noted, "Women don't have enough things to do, enough ways to relax and enjoy themselves." (interview 11). According to interviewee #12, women don't have as good of a social support network, "Men can talk more easily with their friends and share their thoughts. They can just go out, find a friend of theirs, go and sit and drink somewhere and laugh and talk. When a woman is upset she doesn't go out, she usually stays home and doesn't talk to her friends or to anyone.". Another woman expressed it

this way, "Men use drugs or alcohol to forget their problems but women keep their problems with them." (interview 6).

Status and conspicuous consumption

In addition to buying nice things for your girlfriend, there are multiple ways to show off your status, to impress people. Several informants felt that by sending a child to private school, and buying him or her nice clothes and school supplies, parents were making a public statement about how much money they had. The same sentiment was expressed about having a nice car. Neighbors remarked that a certain neighbor had bought a new car and was driving around and parking it in such a way to draw attention to the car. The latest craze in Beira was cellular telephones, which were introduced during the first month I was in Beira (November 2000). Several of the interviewees said that having a cell phone was necessary for some people, but felt that the majority of people bought them to show off their wealth. "Cell phones are popular now and I think that only businessmen need them. But the students carry them too. But they don't really need them. The students who already get picked up and dropped off by their family at school, they are the ones carrying the phones." (interview 1).

Informants also mentioned shopping in nice stores, eating differently, and spending more money than needed, as behaviors to show off wealth. Interviewee three linked clothes, shopping and food consumption patterns of successful people "They get all dressed up to go shopping. They buy things that are expensive and go to expensive stores. They don't eat local foods like *nshima*". (*Nshima* is one name for the local staple food of corn meal porridge.) "Wealthy people don't come from families that teach them to eat right. What they learn is that if you're rich you eat meat, grease, oil, and try to get fat." (interview 5). Having a freezer full of meat, (usually in the living room) is one way

to show your wealth to friends and family. One informant stated that he does not think the meat in a neighbor's freezer was for their consumption, but more to show off to people who came in the house. (interview 4). Conspicuous consumption often takes place in public places. "They buy expensive things, not because they are good quality, but just to show other people they have money. For example, at the Hotel Tivoli a Coke costs 35,000mts (nearly \$2.00), and at the Oceana a beer costs 25,000mts (about \$1.40). They buy these things there to show everyone how much money they have." (interview 1). Elsewhere, a Coke sold for 25 cents, and a beer for 60 cents.

Counterbalancing uncertainty

Interviewees repeatedly told me that a main stressor for them was to not know what would happen next, if you would lose your job or your home. An ability to predict or count on the future was lacking in most people's lives. The theme of uncertainty was mentioned directly or indirectly in the interviews, and also in informal conversations and observations.

"Stability is what is important. If you are not sure whether you will have a job or your house tomorrow then you will worry a lot" (interview 12). One way to hedge your bets in an uncertain economic situation was to diversify your portfolio, to have income from rental property or a small side business, as well as a regular job. The ideal household model was to have one primary wage earner, one or more members who sold food or other good from the house or the market, and one person who was self-employed. Some of the wealthiest people I interviewed told me that their spouse sold something from their house or ran another type of small business on the side.

Connections to the outside world

The Mozambican government began broadcasting its television channel, TVM, to Beira in 1992. Of the survey sample in Ponta Gea, 85% reported that their household owned a television set. Of these TV owners, 85% reported having access only to TVM, while 15% had a satellite dish that allowed them to pick up many other channels. The majority of the satellite channels are in English, coming from South Africa, England (BBC), or the U.S. (CNN).

In addition to Mozambican news and events, TVM regularly broadcast shows from Portugal (RTPA) and Brazil. Brazilian soap operas are extremely popular in Mozambique, and one is shown immediately following the evening news every evening on TVM. We asked people who owned a TV to tell us their favorite program. Sixty percent named the news as their favorite program, while 18% said that the soap operas were their favorite. The rest preferred sports, debates, or other types of programs such as animated programs or game shows.

Access to the Internet, and to computers in general, was difficult and expensive in Beira throughout the study period. One Internet service provider was available in the city, but service was slow, often unavailable, and monthly rates averaged around \$10 per month. An Internet café was opened during the research, but was frequented primarily by foreigners. The computer lab at the Catholic University campus did not have Internet access, and was used mostly for teaching purposes, rather than open access. At the Pedagogic University, a limited number of computers were available to students for 30-minute intervals in the Portuguese cultural center located there. Phone contact with other countries was also difficult and expensive. Direct dial international calling was available to customers who paid their phone bill in U.S. dollars, otherwise an operator placed the

call. International and long-distance domestic calls were beyond the reach of most Mozambicans. Regular mail service was limited to people who rented a Post Office box, in addition to being slow and unreliable.

Changes

Many informants compared today with the past, "The rules have changed and I don't know anymore how I am supposed to live. It was not like this when I was growing up." Or, "During Samora's time we did not have all the things we have today, but we knew where we stood, things were better then." Many specifically mentioned a period in the early 1980s when the government rationed all food and consumer items, and all stores were under government control. Even though supplies were limited during that time, respondents felt that the distribution of goods was fair and people were not competing to outshine their neighbors in conspicuous consumption.

Social support

In general, people interviewed noted a disintegration of social ties and social support in recent years. One woman was describing a recent lunch she had organized for the workers at a public school. "There is less solidarity, people have no time or concern about other people. ... There was one guy there with a bottle opener and we asked him to borrow it to open the sodas. He asked to be paid for the use of the bottle opener!"(interview 2). She was shocked that he would ask for payment and noted that this is an indication of the value placed on the success of the individual rather than of the group.

As in the discussion of lifestyle, people mentioned that social support was better in the time of Samora (1975-1986). Compared to that time, respondents reported that today there is more crime, a worse health care system, and generally less respect for other

people. One respondent, (who was nine when Samora died), said " During the time of Samora there was a lot less sickness because there was a better medical system. They gave out drugs to prevent malaria and other illness, and they reduced the rate of these diseases" (interview 10).

Padrinhos, or godparents, are the ideal first resort when a couple is facing marital problems. The godparents (also translated as sponsors) should ideally be a couple who is older than the couple they sponsor, and thus have more experience with negotiating the perils of married life. The *padrinhos* "have to give your problem their full attention, take care of it if possible, listen to you and try to figure out what's wrong, talk to different people, get the whole story, then call the couple and advise them" (interview 4).

After the socialist opposition to organized religion was dropped in the late 1980s, churches of all kinds and Muslim communities have taken on an increased role in providing aid to families or individuals facing problems. Many of the large churches have smaller groups of people called "communities" within them, usually organized around neighborhoods. People living near to each other are formed into a community, meeting weekly to hear and resolve issues facing their local members. In addition to home visits from priest or pastors, there are groups within the church who are designated to visit the sick or bereaved families and to help with funeral preparations.

Rural-urban ties

Split over whether the rural life is more sheltered and idyllic or equal in exposure to stress and worries. Children are more tempted by bad things in an urban setting, and many parents chose to send their children to rural areas for schooling. Gorongosa high school, two hours from Beira, was popular among parents because of its reputation and also its setting, far from urban temptations. " In the *campo* (rural area) the situation is

different, and people are more unified" (interview 11). " This is a very individualistic place, not like in the country." (interview 6).

Family meetings

Respondents often discussed calling a family meeting as a way to resolve serious problems. In the scenario regarding marital problems (#3), most of the people I interviewed that a problem should first be taken care of by the couple, then by the *padrinhos*, and, if necessary, by calling a partial or full family meeting. Beira is just south of the dividing line between the matrilineal (northern) portion of the country and the patrilineal (southern) portion of the country. In the case of a mixed marriage, there is less guidance as to which side of the family should resolve the dispute. One respondent was pragmatic, "There are some things that you have to talk over with your own family, not just your spouse's family. If the wife is at fault in a problem, then you have to go to her family." (interview 8). In several interviews, people simply said that a family meeting can be called, and, the side of the family called depended on whose family lives closer. If the situation becomes serious and divorce or legal action is imminent, then both sides of the family would be consulted.

Neighbors

There was a lot of heartfelt discussion over whether neighbors make good people to talk to, or not. Several informants stated that a person should not tell his/her problems to a neighbor because s/he cannot be trusted and will tell others about the problem. "Neighbors are not your good friends. They start to learn what's going on in your house and then tell others." (interview 4). One reason is transience, "You might not live with your same neighbors forever but the family is always there." (interview 7). Choosing a

neighbor to confide in requires choosing well, "You can not talk to just any neighbor, but only the ones you are close to, that you can trust." (interview 12).

Stress and *Tensao Alta*

In the semistructured interviews I asked people to tell me about *tensao alta*. Almost all the interviewees told me that it is caused by stress, and that more women suffer from it than men. *Tensao alta* is a folk illness that is very common among Mozambican adults, and is characterized by a number of symptoms, including fatigue, dizziness, rapid heartbeat, and pressure on the heart. Most of the cases are self-diagnosed, without having the blood pressure measured, and the condition flare up in times of social stress.

My interest was primarily in the connection that people make between social stressors and *tensao alta* (TA), in order to understand how stress might be associated with the biomedical illness of hypertension. In short, TA is viewed as a condition that occurs when a person (usually a woman) has too many stressful situations going on in her life, leading to an overload and breakdown. The overload may occur after a sudden shock (e.g., the death of a close family member), or may simply be the accumulation of many problems in her life, problems she cannot cope with. The most commonly cited cause of TA is *preocupações* (worrying), or focusing too much on one's life and problems. Once a person has developed TA it becomes a chronic condition, as s/he is more susceptible to having more episodes of TA during stressful times.

I asked the interviewees to tell me why more women suffer from TA than men. I was told that women are more responsible for the family and when things are not going well (e.g., a pregnant unwed daughter or a son on drugs) she is more affected by them. One man said "Men are better prepared to cope with stress, they are taught not to cry in

any situation, they just learn to accept things that a woman will not. Even if someone dies I cannot cry! But, keeping emotions in can also cause stress. Men have to have "*a força de autodominar*" (self-control)." (interview 5). This sentiment was echoed by other informants, pointing out the heavy burdens that women carry, and their tendency to be more emotionally affected by situations. A young woman I interviewed explained that many women do not have anyone to talk over their problems with. "Men can talk more easily with their friends and share their thoughts. They can just go out, find a friend of theirs, go and sit and drink somewhere and laugh and talk. When a woman is upset she doesn't go out, she usually stays home and doesn't talk to her friends or to anyone" (interview 12).

Throughout the time I spent in Mozambique, in Beira and elsewhere, I was told that thinking too much is not good for a person's health. It is common to hear that a person who is mentally unstable or even psychotic is in that state due to too much thinking. "You can get sick by studying too much and end up crazy. One of our colleagues went with us to a course in South Africa. He wanted to learn English in three months so he studied all the time. He ended up losing it and they had to send him home. Now, after resting a long time he is ok again." (interview 9).

Preparing the Questionnaire for Phase Two

I used the data from the interviews, participant observation, freelists and rankings to create local models of lifestyle and social support for testing in phase two of the study. In addition, I included three other scales in the questionnaire: the John Henry scale (James 1994, and James and Thomas 2000), the Cohen (1983) self-assessment of stress scale, and the life events (social readjustment) scale (Holmes and Rahe 1967, Miller and Rahe 1997). I pretested the John Henry scale during the March visit to the UP (described

above). The other two scales (life events and self-perception of stress) were tested in a pretest and are described below and in Chapter 6.

John Henryism Scale

In Mozambique, I translated the John Henry scale into Portuguese and sent it to Dr. Sherman James, the researcher who developed the scale. He and I finalized the Portuguese version of the scale for use in Beira. This Portuguese version of the scale was pretested at the Pedagogical University (UP) during a follow-up visit in March 2001, (described above). We took note of the participants' age, sex and weight (measured on a bathroom scale), and I measured each person's blood pressure three times. If an individual's blood pressure fluctuated significantly or was on the borderline of high, I measured a fourth time. Blood pressure measurements were made with a mercury sphygmomanometer, listening for the first and fifth Korytkoff sounds.

Of the 63 people who participated in the March measurements at the UP, 55 completed a self-administered 12-item John Henryism questionnaire. Of the 55 forms completed, two did not have the person's name, and one person left too many of the questions (seven) blank, so these three were excluded from the analysis. Of the remaining 52 forms, seven had 1-3 items left blank. Following Dr. James's instructions, I averaged the scores of the items the person had completed, and assigned this averaged score to the missing items. As a result, I have 52 forms of the 12-item scale that can be analyzed.

The majority of the participants are students at the UP, the rest are professors and staff at the UP, and students from other post-secondary schools. The majority of the students at the UP worked as teachers, usually at the secondary schools level, and are returning to complete their college education. The sample of people who completed the John Henryism scale included eight women and 44 men. The number of women is too

low to use sex as a variable in the equations below. Table 5-6 describes the sample from the UP who completed the John Henryism scale.

Table 5-6. Age, Weight and John Henryism score. (n=52)

	Minimum	Maximum	Mean	S.D.
Age	20	46	29.15	7.29
Weight	50	76	62.23	5.72
John Henry	31	58	47.54	5.53

The results of regression equations to predict blood pressure by age, weight and John Henryism scores are shown in Table 5-7. Age is a significant predictor of systolic and diastolic blood pressure, as is weight. Scores on the John Henryism scale do not significantly predict either measure of blood pressure in a regression equation.

Table 5-7. Prediction of Diastolic and Systolic Blood Pressure by Age, Weight and JH. (n=52).

Diastolic	Slope	Significance		Systolic	Slope	Significance
Age	.217	.109		Age	.300	.027
Weight	.347	.012		Weight	.312	.021
JH scale	.124	.337		JH scale	.057	.653

The Self-Perceived Stress Scale

The Cohen self-perceived stress scale (1983) was translated into Portuguese at the end of phase one, in preparation for its use in the survey questionnaire in phase two. The original Cohen scale has ten items, and respondents are asked to give a score using a five point Likert scale. The research team pretested the Portuguese translation of the ten-item, 5-point Likert scale on 15 people in Ponta Gea. Following the pretest, we decided to narrow the scale down to four questions and use a three-point scale. Respondents were having a very difficult time distinguishing between the ten questions, and an equally difficult time using the five-point scale. A few respondents in the pretest said, "you just asked me that" during the Cohen scale questions.

The Life Events Scale

The life events scale (Holmes and Rahe 1967, Miller and Rahe 1997) asks people about stressful events that may or may not have happened in their lives in the previous year. This scale was also translated into Portuguese and pretested. The pretest showed that people had no difficulty in replying to the yes/no questions about things like whether they had moved, gotten married, or had a family member die in the previous year

The final version of the questionnaire is presented in the next chapter, which describes the survey done in phase two of the research project.

CHAPTER 6 PHASE TWO: MODEL TESTING

Phase Two: Survey Methods

Research Assistants

In May and June 2001, I selected three research assistants for phase two, trained them, and together we finalized and pretested the survey instrument. I solicited candidates for research assistants from the two universities in Beira, the UCM and the UP. At UCM, I asked the Dean of medical education to recommend students who met my criteria. I requested that he find serious and reliable students who are interested in research, need to earn some money (since many of the UCM students are very wealthy), and preferably be from Beira – both for linguistic competence and to insure that they would be in town for the June/July school holidays. The Dean suggested two students who were completing their first year (this was the end of the first year of the medical faculty's existence). I met with them and decided to hire them both because I thought they would complement each other and the project. Ms. Aguida was young (20), was very bright and personable, good with computers, but a little bit shy at the beginning. Mr. Francisco had worked as a medical technician in a rural health center, and still worked for the Ministry of Health but they had given him six years leave to complete his medical studies.

At the UP, I asked an anthropologist who teaches in the geography section to recommend two students. He suggested two third-year geography students, I interviewed them, and chose one. The student I did not choose was from another province and was

extremely shy. Mr. Bizeque was a fourth-year student, who had been a teacher for 15 years before going to university, was from Beira, married with children and had previously lived in Ponta Gea. He had also worked on a number of research projects and was familiar with recruiting people to be in studies and with interviewing techniques.

The initial training of the research assistants took place over a ten-day period. I began by explaining the objectives and methods of the study, and how I envisioned the survey to would be done. We developed a contract outlining their participation in the study and payment.

I paid them an hourly rate based on the pay scale used for research projects at the Catholic University (approx. \$1 per hour), plus travel time and costs. I told them that they would receive a bonus at the end of the project if they worked well, and they all were given a \$50 bonus in August at the end of the survey.

We translated the questionnaire from English to Portuguese, discussing each question and what information it was supposed to elicit. At various stages in the translation we practiced the newly translated section on people. Their training continued during the pretest and the survey.

During the survey I continued to train the research assistants. I gave them feedback both during group meetings and privately. I talked with them about the presentation of the study to potential participants, the transition to the interview, their interviewing techniques, and how they handled questions from interviewees. In the final weeks of data collection I trained the research assistants to code the data, and we spent time at the beginning or end of the day coding the interview forms. After the data had

been entered, I showed them how the data looked in Excel, and we did some of the analyses together in SPSS (2000).

Translation of the Questionnaire

As part of their training, the research assistants and I translated the questionnaire from English to Portuguese. I wanted the translation to be in the Portuguese that is spoken in Beira, and not necessarily textbook Portuguese. Mr. Bizeque (from the UP) was the best at translating the questionnaire, even though his English was the most limited. He had previous research experience, a solid training in the Portuguese language, plus a gut feeling for the level of understanding we would encounter in Ponta Gea. These qualities contributed to his invaluable input during the translation and throughout the survey.

Pretest of the Questionnaire

Once the questionnaire had been translated and each section tested on a few people, we pretested it on ten people living in Ponta Gea. The pretest was a close approximation of the actual study conditions. We went to people's houses, asked if they met the study criteria, and explained the purpose and structure of the questionnaire. After each pretest interview, we returned to my house to discuss how the interview had gone and what changes we needed to make, either to the instrument or in our interviewing techniques.

Sampling

Although the survey sample was nonrandom, I designed it so the sample would a cross-section of the neighborhood of Ponta Gea. The research team and I divided the neighborhood into five zones. We used landmarks and main streets to divide the area into smaller neighborhoods, and discussion with three key informants. For example, one

zone is the area around the Governor's house, another around the Catholic cathedral, and a third the zone where the *bairro* meets the main city's commercial center. We interviewed approximately 50 people from each zone, for a total sample of 265 people. Slightly more than 50 people were interviewed in the larger zones, and fewer in the smallest zone (A). The zones are marked on the map in Appendix A.

Table 6-1. People Interviewed by Zone.

Zone	Women	Men	Total
A	25	22	47
B	29	29	58
C	27	27	54
D	27	25	52
E	27	27	54
Total	135	130	265

Four people were interviewed who were later excluded from the final analysis, two were the spouses of other respondents, and two had questionnaires that were incomplete. Thus, the total sample of eligible participants is 261.

A total sample size of 250 was estimated for the survey before I went to Beira. I wanted to have enough people in the survey so that I could break the sample down by sex and by age group and still have enough people in each cell for the analysis. I also projected that this number of interviews was feasible given the time available. I initially planned to have two teams of researchers, one led by me, and another by an anthropology student from UEM in Maputo, who was originally from Beira. Once I started doing the interviews in phase one, I decided that I wanted to be present at every interview, whether or not I was the one conducting the interview. I knew this could reduce the number of interviews (possibly to 120–130), but would also increase their quality and my understanding of the results. Even though only one team was interviewing, we were able to complete the 265 interviews in just seven weeks.

I decided not to interview people living in an abandoned hotel on the edge of Ponta Gea. These people are squatters and there is no water, electricity or sanitation in the building. I felt it was primarily a safety consideration to not interview there. Likewise, I chose not to interview at the UP dormitory in Ponta Gea. The students there were not living in a normal family environment but were living in rooms with nonrelated people.

Research Permission

Before starting the survey, I met with the provincial director of health (DPS), and he enthusiastically endorsed the project, asking that I give a small seminar for his staff with the results. He confirmed that there are almost no studies on adult health in Mozambique, and few health studies using qualitative and quantitative methods. The director gave me invaluable feedback on the project, and brought up the issue of paying the interviewees. His opinion was that it is better not to pay people for their participation because it will ruin the chances of future researchers who do not have the ability to pay.

The Provincial Director of Health brought up the ethical question of what to do when we found people with high blood pressure. He suggested I speak to the medical director of the Beira Central Hospital (previously the Indigenous Hospital). I also met with the director of the Ponta Gea Health Center (previously the European Hospital). She and I set up a system to refer interviewees who had high blood pressure to go there for follow up. We printed up referral forms to give the participants with the date of the interview, their name, and the values of the three blood pressure measurements taken at the end of the interview. It was more convenient for the study participants to go to the Ponta Gea Health Center because they could walk there, than to the Beira Central Hospital.

I also obtained permission from the *Secretario de Bairro* of Ponta Gea. He is a member of the ruling party who is appointed to coordinate government services at the bairro level, and to solve local disputes. I visited him with the members of the research team, introduced them and explained our project. He recommended that we make ID cards with each of our pictures, which he then signed. The research assistants wore their ID badges for the first week or so, and thereafter carried them in their pocket. When we went to tell the *Secretario de Bairro* we had finished the study, we found he was no longer there but had been replaced.

Layout of the Questionnaire

Language

The questionnaire was administered orally and answers recorded on the questionnaire form. The instrument was written in Portuguese. Three interviewees, all women, were interviewed in local languages at their request, two by Bizeque and one by Francisco who translated the questions into the local language but filled in the answers in Portuguese. The rest of the interviewees felt comfortable speaking Portuguese so we used Portuguese for their interviews. The words and style of the language in the questionnaire were carefully chosen to be accessible to everyone, even people who had never had formal schooling.

Prompt card

We prepared a 3 x 5 file card with the categories of people who provide social support. This card was designed to prompt people's responses for five scenarios that were read in the section on social support. If a person had told us that s/he had not gone to school, or we had other indications that the respondent could not read, we did not give them the prompt card. In other cases where we suspected the person could not read, we

asked them if they would like to look at the card with the categories on written on it.

About five percent of the people (n=12) we offered the card to declined to take and use it, saying they could not see it because of vision problems.

The sections

The questionnaire had seven sections:

1. Demographic
2. Lifestyle
3. Cohen Stress scale
4. Social support
5. Life events
6. Family and person health history
7. Anthropometric and BP measurements

The English and Portuguese versions of the questionnaire are in Appendices C and D.

Modifications during the survey

The questionnaire initially included a 12-item section on John Henryism. We eliminated these questions from the final version of the survey because the respondents had difficulties with understanding and answering them. Specifically, respondents had trouble specifying an answer along the five-point Likert scale. More importantly, there was a problem with social desirability, as has been noted by James (2000). These difficulties are detailed in Kennedy and Barkey (n.d.).

The questions on the Cohen self-perceived stress scale also had to be modified during the survey, although we kept the scale in the questionnaire. The original Cohen scale consisted of ten questions, but this was decreased to four in our questionnaire, because of complaints by respondents about the repetition of the same theme. We modified the wording of the questions according to feedback from the participants and the research team. As with the John Henry scale, participants could not answer using the

five point Likert scale, but had an easier time after we reduced the number of choices to three.

Data Collection

We began formal data collection in phase two on June 15, 2001. I attended all the interviews, along with one or two of the research assistants at any one time. This schedule gave the three research assistants time off to attend to personal matters since we were working seven days a week. We interviewed all day, usually until 7 or 8 pm. Interviews were done in the evenings and on weekend in order to reach working people, particularly men. We had a modified work schedule on the weekends, usually stopping by 2 or 3 pm, so as to minimize our encounters with people who were drinking alcohol. After dark and on weekends one of the male research assistants was always present because it would have been improper and unsafe for Aguida and me to work alone. Our time schedule was constrained by the fact that the research assistants were all students and had to return to classes during the first week of August. We averaged eight interviews on a full workday, occasionally doing 10 or 11 per day, over the period of seven weeks.

We would begin at the edge of a zone within Ponta Gea and walked house-to-house, introducing ourselves, giving a brief summary of the project, and asking if there were people in the house who could talk to us. For apartment buildings we began at the bottom of the building and worked our way up. We prepared a one-page flyer about the study and left it when no eligible adult found was home, so they could look it over before we returned. We kept a notebook of appointments and houses to go back to later. Evenings were a very popular time for scheduling appointments. Weekend days were good times to find people who worked away from home during the week (Bernard 1995).

Once a person agreed to participate, we were usually invited into the living room or chairs were brought to the yard. If the person's house was too small or they felt embarrassed by its simplicity then we conducted the interview outdoors. The Institutional Review Board at the University of Florida determined that we could obtain oral, rather than written, informed consent. (See Appendix E.) Our oral consent procedure consisted of the following information. We explained who we were and our affiliations, and that this study was voluntary and anonymous. We told the interviewee that she or he was free to not answer any question, or to stop the interview at any point. When we began the interview the person usually started by telling us their name, even though we had said we did not need to know names. Each questionnaire was assigned a unique ID number. More than half the participants asked if I lived in Ponta Gea. I replied that I did, told them the house we were renting, and most of them knew our landlord and the house.

The four members on the research team took turns conducting the interviews. Often my research assistants suggested whose turn it was to conduct the interview, or who should do it. They usually requested that I interview the wealthiest people we encountered. When one of my research assistants was doing the interview I took notes in a notebook of interesting comments and sometimes ask follow-up questions during the interview or afterwards. I also unobtrusively took note of the items on display in the public areas of the homes where we interviewed because I was struck by the use of public space to demonstrate prestige or status.

The interviews lasted between 30 and 120 minutes. Many of the interviewees wanted to talk about the questions or the issues introduced by the questions. The Cohen

self-assessment of stress prompted many of the respondents to tell us about stressors in their lives. In the same vein, the life events questions also generated many stories about the respondent's life in the past year or several years. We took notes on these open-ended discussions in separate notebooks and compared them after the interview. The research team member(s) not conducting the interview took notes on these stories and insights in order to free the interviewer up to focus on the questionnaire and the person being interviewed.

Measurements

Because blood pressure is highly responsive to various stressors, how it is measured is extremely important. In a best-case scenario, multiple measures are taken and the mean of those measures, or the mean of the final measures taken, is used as the person's blood pressure. The person should be seated comfortably, and (ideally) not have consumed alcohol or caffeine during the past hour. Blood pressure can be measured using a mercury sphygmomanometer and stethoscope, or one of a variety of electronic machines. These machines are difficult to move and require an external power source, and thus, have not been widely used in blood pressure research in field settings in Africa (Mufunda et al. 1996).

I took all the blood pressure measurements, measuring each person at least three times. The three measurements were recorded onto the interview form. I was the only person to measure blood pressure to reduce interobserver variation. We wrote the blood pressure measurements on another paper and gave it to the participants, unless they said they were not interested. If a person's BP was slightly high, or they reported not knowing they had hypertension, or if I felt that stress related to our presence or the interview was making the BP go up, we would make arrangements to come back a day or two later to

remeasure. The next day we were usually still in the area near to the person's house and we would schedule a return visit.

The members of the research team helped each other measuring the heights and weights. The participant was asked to stand against the wall and a flat board was placed level on their head and a line drawn on the wall. The height from this line to the floor was then measured using a tape measure. Weights were measured with a portable (bathroom) scale and rounded to the half kilo. The scale was set to zero before each weighing and was recalibrated with another scale weekly.

At the conclusion of the interview, the person conducting it would check to make sure the form was complete and ask if the respondent had any questions. We thanked the person for taking the time to talk with us and reminded him or her that we would be in the area for a while and to not hesitate to contact us if necessary.

Inclusion criteria

To be in the study, a person had to be over age 30, a resident of Ponta Gea, and be a Mozambican citizen. We only interviewed one person per household. We did not include women who were pregnant in the survey. I did include one person who was 29 years old but the following month she was turning 30.

I wasn't sure whether we should include Mozambicans who were not primarily of African descent. After soliciting advice from various sources, I decided to include them and to indicate their race on their interview form, to be able to separate them out of analyses if I chose to. During the survey we found adults representing 15 other nationalities living in Ponta Gea (who were not interviewed). The most common nationalities encountered, besides Mozambican, were Portuguese and Indian.

First impressions

The most common reaction to our arrival at someone's door or yard was to assume that we were missionaries. We had to explain repeatedly we were not from a church group, but that we were doing a health project. Still, there was a lot of suspicion, particularly among Muslim families. In response to our question asking whether she would like to participate in our study, one Muslim woman stated, "I am not from your church". We explained we were part of a health study with no ties to a church, and she agreed to participate. Word got around the neighborhood pretty quickly that we were a health study and not a missionary group.

Measuring non-participants

People who did not meet the study requirements were told that they could still have their weight and blood pressure measured. Other family members, friends or neighbors were often present and asked if they could participate. If they met the inclusion criteria we made an appointment to interview them at their home, but otherwise we explained that we could just tell them their weight and blood pressure. (People were less interested in knowing their height, because it is printed on their identity card.) We measured the weights and heights of children. These extra-study measurements were written on slips of paper and given to each person, or, in the case of children, given to the oldest child or a parent. The measurement of people who were not in the study helped to reinforce our reputation in the community as a health team, and dispel the myth that we were missionaries.

If a family member or friend was present, the research team member not directly involved in the interview would engage that person in quiet conversation, or ask if she or he would like to have his/her weight or blood pressure measured. We distracted the other

people or person in the room to allow the interviewee to speak as freely as possible. After the demographic (first) section of the interview, other people in the room usually became bored and drifted away.

Receptivity to the study

On the whole, people in Ponta Gea were very receptive to the survey. The majority of the participants were very helpful, and welcoming. Many gave us coffee or sodas, along with bread or cake or cookies. We refused several invitations for lunch or dinner so as not to cause a burden for the participants and their families. Many participants and nonparticipants were curious about the study, asked us about blood pressure, told us of their own experience with blood pressure, and asked about what we were finding.

In only a few cases we found people to be less than completely cooperative. One woman was combative (asking the interviewer to ask her a "better" question or saying "I do not want to talk about that with you"). A second woman cried because she was having serious personal problems, and one man was indifferent, watching TV and not paying much attention to the interview. These three people completed the questionnaire after the interviewer asked if they would like to stop or continue, and became more cooperative as the interview progressed.

Most of the respondents wanted to talk, especially during the questionnaire sections on social support and perceived stress. Other people asked about what blood pressure was actually measuring, the dangers of high blood pressure, what was low blood pressure, or about general health issues. We discussed these topics and spent a lot of time listening to people tell us about their personal and health issues. Listening

sympathetically seemed to be a help to many of the interviewees and they often thanked us after the interview for coming to see them.

Referral to the Ponta Gea hospital

If participants had blood pressure measurements greater than 140 mmHg (diastolic) or greater than 90 mmHg (systolic), I asked if they would like to be referred to the Ponta Gea hospital. I explained we had arranged with that hospital for follow-up care with people from the study at no charge. A few of the respondents were already under the care of the main Beira hospital or a private doctor (usually a family friend) and refused the referral. The majority of those found to have an elevated BP accepted the referral form. In a few cases I referred nonparticipants to the Ponta Gea hospital after measuring their blood pressure and finding it was high. The research team made several visits to the PG hospital to see who was coming with the referral slips and to see what the technician there was finding and prescribing.

Coding the Questionnaire

The code sheet for the questionnaire is found in Appendix F. The code for each question was written in the left hand margin of the interview form and later entered into the computer.

The coding for level of schooling followed the system used in the national census (INE 1999). The structure of the school system in Mozambique has changed several times and the census put together a chart/table showing the equivalent educational levels for the different times. In the questionnaire we asked people what year they completed their formal education so we could correctly assess and code their level to be comparable to the other participants. The Mozambican census code sheet for educational level is in Appendix G.

The variable maternal language was coded in a two-step process. After we had listed all the languages participants reported speaking ($n=23$), we coded them from 1-23. These were then collapsed into four groups, (1=Portuguese, 2=Indian languages, 3=Sena/Ndau, and 4=other Bantu languages), and each person was given a second code.

A code for "place of birth" was also created in a two-step process. Initial responses were coded as follows:

1=Beira

2=Sofala (the province where Beira is found)

3-11= the other provinces of Mozambique

12=outside Mozambique.

Later, numbers 3-11 were collapsed into three categories; north, central and southern provinces.

One question asked about where children in the household went to school (if children in the household went to school). The respondent gave the name of the school and we made a list of all the schools named. One of the research assistants, Bizeque, had been a teacher in the area for many years, and he grouped the school names into four categories: private, public, church-related, and university/boarding schools.

In the final section of the questionnaire the respondent is asked to give symptoms she or he had experienced if she or he reported having hypertension. These were put in a list, with like symptoms combined under one heading. Likewise, respondents also gave symptoms of hypertension experienced by their immediate family members. These were also put in a list with like symptoms combined.

Data Entry

The data were entered into an excel worksheet and later imported into SPSS (2000). Hilton Vasconcelos assisted with the data entry process. The statistician at the Geographic Information Systems office of the Catholic University helped manipulate the data in excel and convert it to SPSS (2000). Some of the text data were initially organized in MS Word. We made lists in Word of the hypertension symptoms respondents reported, or symptoms they reported for their family members. We also listed the schools people sent their children to, maternal languages, and the medications taken for hypertension.

Data Checking and Verification

After the data were entered, the values on the interview forms were checked against the values in the database. The minimum and maximum values for each continuous variable were checked to make sure that only reasonable values were entered (e.g., no ages below 29 and no heights above 2 meters). For categorical data, frequencies were run to make sure that only the allowed values were found. Missing or irregular data were completed or checked by returning to the participant's house and verifying the information with him or her.

Creating New Variables

Age was collapsed into four groups; 29-39, 40-49, 50-59, and 60 and over.

BMI was calculated with the following formula: weight/height^2 .

Monthly income in the Mozambican currency *meticals* was converted into dollars,

Income in dollars was collapsed into terciles.

The average of the three systolic and three diastolic blood pressure measurements was calculated. The mean of the three is used as an individual's diastolic or systolic blood pressure.

Two dichotomous variables were created for the two definitions of high blood pressure (≥ 140 and ≥ 90 , ≥ 140 or ≥ 90).

Several other new variables were created during the course of the data coding and analysis. I describe them in the section where I introduce and use the variable in the analyses below.

Presentation of Preliminary Results

Preliminary Analyses

Preliminary analyses of the survey data were done in the field. Time constraints prohibited doing all the analyses in the field. The rest were completed after I left Mozambique, using SPSS (2000) and Anthropac (Borgatti 1992).

Presentation of Study Results

On October 17, 2001, Ms. Aguida, Mr. Francisco and I gave a presentation about the research to the medical students at the Catholic University. Mr. Francisco and I went to the provincial health department several times to arrange a seminar there. The provincial director was on annual leave for one month and no one else was able to host the seminar.

Meetings in Maputo

In August, September, and October of 2001 I traveled to Maputo to work with my students at Eduardo Mondlane University, and to participate in their defenses of their theses. I also met with Dr. Damascaeno, the cardiologist, and shared the preliminary results with him. I talked to several colleagues at UEM about what I was finding in the study and sought out their input on the results and questions that I had about the data.

Follow-Up Interviews

After formal data collection in phase two was completed and I did the preliminary analyses of the data, I was faced with several questions raised by the data. To further investigate these issues, I conducted formal and informal follow-up interviews with both key informants from phase one and with phase two interviewees. The topics explored during these discussions included, but were not limited to; food patterns, eating at home compared to eating away from home, food preparation, use of traditional and alternative medicines to treat high blood pressure, and the role of churches in stress management and healing.

In September and October of 2001, I went back to several of the phase two participants' homes to see how people I identified as having extremely high blood pressure during the study were doing, and whether they had sought out treatment. One woman had been hospitalized and not at home the first time I went to her house. On a later visit, she told me that her daughter was paying closer attention to her health problems and taking her to the hospital for regular checkups, a marked change from her daughter's behavior previously. Other participants told me during the follow-up visits that they were doing well and had been able to resolve most of the problems they had been experiencing.

Two women from phase two spontaneously came up to me on the street at different times to report on what had happened since I interviewed them. One was out "power walking" early in the morning, and she told me she was losing a little weight to lower her blood pressure. She also said that a neighbor I had interviewed had gone to the hospital where she was diagnosed with a heart defect and sent to Maputo. The second

woman thanked me for interviewing her and measuring her blood pressure, and said she was now thinking more about her health and ways she can prevent high blood pressure.

Archival Research

I conducted research on the history of Beira and its neighborhoods during phase one and after the completion of phase two. Most of this research was done with secondary materials at the Beira branch of the national Heritage and Cultural Archives (ARPAC). The director, Dr. Chuva, and the head of the library, Mr. Joao Joaquim, were most helpful in this undertaking. I also interviewed people who were identified as having special knowledge about the history of Beira throughout the research project. The information from the archives and these interviews helped me to choose the neighborhood for the research, and to understand the stories people told and references they made during both phases of the research.

Survey Results

Describing the Sample

The survey sample is almost evenly split between men and women, with 131 women and 130 men. Respondents are between the ages of 29 and 79, with a mean age of 44.5. The sample is skewed towards the low end of the age range, with 38.7% of the sample between 29 and 39 years old. One third of the sample is between 40 and 49, and just 28.4% are over age of 50.

Number and Percent of survey participants by 10-year Age Groups:

29-39 years old	101	38.7%
40-49 years old	86	33.0%
50-59 years old	46	17.6%
60 years and up	28	10.7%

The weights of the participants are given in kilograms, and range from 37 to 117.5 kilograms. The heights of the participants are measured in meters. See Table 6-2. Body Mass Index (BMI) was calculated as weight (kg) divided by height (m^2) - (weight/height²).

Table 6-2: Age, Weight, Height, BMI and Income. (n=261)

	Minimum	Maximum	Mean	S.D.
Age	29	79	44.52	10.8
Weight (kg)	37	117.5	70.27	15.26
Height (m)	1.41	1.98	164.05	8.55
BMI	15.62	48.28	26.17	5.68
Income* (\$)	12.50	1,750.00	234.9	255.9

*n=241

Income

Monthly income was measured in meticaís (the Mozambican currency), and later converted to dollars (20,000 meticaís = 1 USD). The national minimum wage in Mozambique is 500,000 meticaís per month, (\$25 USD per month). Five people report a household income below the minimum wage of \$25 per month. The range in income is striking, and exactly what I was expecting. Although Ponta Gea was designed by the Portuguese to be a middle-class neighborhood, today it is home to people with a wide variety of socioeconomic levels. The survey sample reflects that diversity in income.

Asking people about their household's monthly income was clearly the most difficult question on the questionnaire. Twenty people did not give an amount. A few respondents refused outright to answer the question, while others said they did not know because their spouse did not tell them his or her salary, or because they did not know about the income of other household members. Note that the sample size for the variable income is 241, 20 people fewer than the rest of Table 6-2.

I wanted to be able to assess income in terms of income per household member. Because income was reported as total income for the household, and we asked how many people lived in the household, I created a second income variable; household income divided by the number of people in the household.

Education

Education was obtained by asking: What's the highest grade in school you have completed? In Portuguese we used both the words *nível* and *classe*, literally level or class, for the English word grade. After people told us the highest grade completed, we asked them what year they completed that grade. The year was necessary to classify them according to the different educational systems that have existed in Mozambique over the years. We used a table produced by the Mozambican census (INE 1999) to classify people's educational levels from the different systems into equivalent categories. This table appears in Appendix G. Table 6-3 provides the number and percent of the sample that completed each level.

Table 6-3. Education Level of Survey Participants.

		Frequency	Percent
0	None	19	7.3
1	Literacy	1	0.4
2	Primary School	67	25.8
3	Middle School	47	18.1
4	High School, part 1	55	21.1
5	High School, part 2	35	13.0
6	Vocational	0	0
7	Technical training	3	1.1
8	Advanced technical training	16	6.1
9	Teacher training	0	0
10	University	19	7.3
Total		260	100

Household composition

Each respondent was asked to report how many adults (over age 18) lived in the household, and how many children. To get a picture of household sizes, the total number of people who live in the household was summed (adding the number of children and the number of adults). More than 57% of the households consisted of four to seven people, and the mean size of 5.74 individuals per household was higher than the Mozambican average of 4.2 (INE 1999).

The household composition for the survey sample is shown in Tables 6-4 and 6-5.

Table 6-4: Household composition. (n=261)

	Minimum	Maximum	Mean	Standard Deviation
Adults living in the home	1	9	3.24	1.61
Children living in the home	0	9	2.51	1.93
Total household members	1	16	5.74	2.67

Table 6-5. Number of people per household (adults and children) n=261

Number	Frequency	Percent
1	11	4.2
2	18	6.9
3	21	8.0
4	35	13.4
5	45	17.2
6	36	13.8
7	34	13.0
8	24	9.2
9	17	6.5
10	10	3.8
11	3	1.1
12	2	.8
13	2	.8
14	1	.4
15	1	.4
16	1	.4
Total	261	100

Eleven people reported living alone. Most of these were maids or guards who live in the small houses (*dependencia*) at the rear of most properties, and consider themselves as constituting a separate household. One man is a mechanic and lives at the shop where he works. An older man (age 79) reported living alone, although his maid lives in the *dependencia* behind the main house with six of his relatives. The older man's son and grandchildren lived a few blocks away. A single woman (age 31) lives in an apartment provided by her employer (the railroad). Her brother lives in the apartment next door with his wife. Two men reported that their wives had recently left them, to explain why they are living alone. One 32 year-old male teacher lives alone in housing for professors, and had recently returned from studying for two years in Portugal.

Smoking

Smoking was reported by 18.5% of the total sample. Older people smoke less than younger ones. The age group 40-49 had the highest rate of reported smoking, 22%. Only 13 women reported smoking, compared to 35 men. I would caution against the over-interpretation of these data. Smoking status was self-reported during an interview with a team of people who had identified themselves as health researchers and were asking about the respondent's health.

Table 6-6. Number and percent of people who report smoking by Age Group

	Age Group				Total
	29-39	40-49	50-59	60 +	
Do not smoke	83	66	41	22	212
Smoke	18 (17.8%)	19 (22%)	5 (9.2%)	6 (4.6%)	48 (18.5%)
Total	101	85	46	28	260

Race or ethnicity

People were assigned by the research team to one of three racial/ethnic groups: having primarily Portuguese, Indian or African heritage. These categories are based on the classification system used in the neighborhood and in the city in general. People of Indian heritage are referred to in slang as *mwenye or mounhe*, used to refer to a person from India. Eighty-five percent (n=222) of the sample is primarily of African heritage, while six percent (n=16) are of European heritage, and nearly 9% (n=23) of south Asian descent.

Mobility and belonging

I hypothesized that mobility and being from outside of the community would act as stressors. Three measures were used to evaluate this hypothesis: years of residence in Ponta Gea, maternal language, and province of birth.

Residence in Ponta Gea

Prior to independence in 1975, Ponta Gea was reserved for people from Portugal, a few from India, and the occasional Mozambican *assimilado*. Eight people in the sample have lived in Ponta Gea for more than 27 years (before 1975). Most of these are of Indian heritage, with the others coming from *assimilado* families. Mean number of years living in Ponta Gea is 13.4. One quarter of the sample reported moving into Ponta Gea between 1975 and 1980, the period that the government was most actively nationalizing property and distributing the houses.

Maternal language

We used the question about maternal language from the Mozambican census (INE 1999), which asks: "In what language did you learn to speak?" Portuguese is the maternal language of 30% of the sample. The two primary local languages, Sena and

Ndau, were the maternal languages of 10.5% and 21% of the sample respectively. Eight percent of the people surveyed speak Chuabo from neighboring Zambezia province (to the north) as their first language. Another 6.5% spoke Xitswa (from the south) as their first languages. Respondents listed 23 maternal languages, but apart from the five listed here, none were spoken by more than 5% of the sample.

Province of birth

Place of birth was coded as the province of birth, except for people who were born in Sofala province. Beira is the capital of the province of Sofala, and people born in the city of Beira were coded as being born in Beira. If they were born in Sofala, but outside of the city of Beira, they were coded as Sofala province. More than 40% of the sample was born either in Beira or in Sofala province. Seventeen percent of the people were born in Zambezia province to (the north of Sofala), and 14% are from Inhambane province (to the south). Six people in the study were born outside of Mozambique. They were born to Mozambican parents who were living outside the country at their birth, usually due to refugee, student, or diplomatic status.

Table 6-7. Place of birth of survey participants: (n=261).

Province	Number	Percent
Beira	41	15.7
Sofala (not Beira)	67	25.7
Manica	8	3.1
Tete	19	7.3
Inhambane	38	14.6
Gaza	4	1.5
Maputo	18	6.9
Nampula	10	3.8
Zambezia	45	17.2
Cabo Delgado	3	1.1
Niassa	2	0.8
Outside of Mozambique	6	2.3

Lifestyle

The lifestyle scale is based on the 24 items elicited from respondents in phase one through freelists and then ranking (described in Chapter 5). See Table 6-8.

Table 6-8. Number and Percent of Participants Responding Affirmatively to each Lifestyle Item.

Item/behavior	Number	%
Electricity	240	92.3
Speak Portuguese at home	236	90.8
Own a television	220	84.6
Stereo	210	80.8
Being married	195	74.7
Running water	188	72.3
Refrigerator	166	63.8
Freezer (separate unit)	153	58.8
Have a maid	143	55.0
Stove	132	50.8
Own a video player	129	49.8
Telephone	119	45.8
Speak some English	117	45.0
License	115	44.2
Children in private school	107	41.8
Water tank	104	40.0
Cellular phone	96	36.9
Own a car	86	33.1
Vacation away from Beira	86	33.1
Own home	81	31.2
Air Conditioner	74	28.5
Eat Out	43	16.5
Have a satellite dish	39	15.0
Private medical care	18	6.9

The least frequently reported lifestyle items were: having access to private medical care (6.9%), having satellite TV (15%) and eating out in restaurants (16.5%).

Marital status

We used the Mozambican census (INE 1999) categories for marital status. Many marriages in Mozambique are not registered with the government, but are legal by virtue

of the couple having lived together for more than 5 years. The number and percentage of people in each marital category is given in Table 6-9.

Marital status appears to be a simple thing to measure, but many people changed their answer after we asked follow-up questions. For example, one woman initially replied "single", but then said she had been married and her husband died, and was now living with someone else for several years. Another man also replied singling initially, but then said that he was separated. We wanted to evaluate each person's current marital status, based on the item "have a spouse" in the lifestyle scale.

Table 6-9 Marital Status (n=261)

Marital Status:	number	percent
Single	8	3.1
Married	105	40.2
Common Law	88	33.7
Separated/divorced	34	13.0
Widowed	26	10.0

About three quarters of the sample lives with a partner, not surprising given the age group we studied. There were eight single (never been married) people in the sample. These were all marginal individuals. One woman of Portuguese descent, whose entire family had fled to Portugal in 1975, reported, "men only complicate your life". Even though she was single, she did not live alone; she shared a house with another couple. People who actually live alone were even more marginal, and they are discussed above.

Electricity

The vast majority (92.3%) reported having electricity in the home, while 20 families (7.7%) did not. Census data for the urban dwellers in Sofala province shows that 65% of those who live in cement block houses (like those found in Ponta Gea) have electricity. Because there are cement block houses in the reed city which are not on the

electric line, this brings down the average for the urban dwellers across the province. The entire neighborhood of Ponta Gea is on the power grid however, and the participants who reported not having houses power were usually *dependencias* or garages that had been converted into housing or where the electricity had been shut off.

Home ownership

We used the Mozambican census categories to evaluate the relationship people have to the home they live in. There are four categories: own the home, rent the home, have the home given or lent to them (*cedida*), or live in a home provided by their employer. Because of the policy change in home ownership in Mozambique in recent years, many people have bought, or are in the process of buying their home from the national government.

The largest group, nearly 44% of the survey sample, reported owning their homes. Of the 31% who said they rented, about half reported renting from the government, which means they are in the process of buying their house from the government. A small number reported living in a home given or lent to them. Nearly 23% of the sample lives in housing provided by their employers, either the railroad or a branch of the government (e.g., Ministry of Health, Ministry of Finance).

Table 6-10. Home Ownership Status (n=261)

	Frequency	Percent
Own	114	43.7
Rent	81	31.0
Given/lent	7	2.7
Employer	59	22.6

Stereo ownership

Two hundred and ten people (80.5%) report that their households own a stereo (a radio with cassette player), while the remaining 51 respondents (19.5%) said they did not.

The most recent Mozambican census (INE 1999) reports that 55% of the people living in the urban areas of Sofala province report owning a radio.

Three lifestyle scores

Lifestyle measure one. I computed three different measures of lifestyle from the lifestyle data. For the first measure, I totaled the number of items on the lifestyle scale that each person reported having or doing, with each item having the same value in the score. Thus, this measure ranges from 0-24. For the second and third measure of lifestyle, I weighted the values of the different items, according to the ranking done in phase one and the results of factor analysis, respectively. I explain the second and thirds measures in more detail below.

The scores on the first lifestyle variable (a composite of the 24 items in the scale) ranged from zero to 24. One man had all 24 items on the scale, while another man had none. I was not surprised that the man who had none of these items was a widower who has never been to school and lives in a room behind the bakery where he works while raising four children. On the other hand, the man with all of the 24 items has the highest income in the sample, is a member of parliament, and has a Master's degree. The mean score was 12.

The reliability analysis (SPSS 2000) showed an overall Cronbach's alpha of .8899. The alpha score did not increase significantly if any item were removed from the scale.

Lifestyle measure two. The second measure of lifestyle was calculated using the ranking data from phase one to weight each item. I transformed the scores for each item given in Table 5-2 in the previous chapter into ratings from 1 to 5. Items that were ranked as more important by people in phase one were given a score of 5, while those that were

ranked as less important were given a score of 1. For example, owning your home had the lowest consensus score on the ranking (3.73) so home ownership was equal to five in this rating system. Having a freezer had a much higher consensus score (20.45) and freezer ownership was equal to two in this weighting system. I divided the items into five groups using natural breaks in the scores on the ranking exercise.

Each lifestyle item was then multiplied by its rating, to create a new variable. Finally, I summed the 24 new variables (the lifestyle items multiplied by the rating) to create the second measure of lifestyle. The minimum score on this second lifestyle measure is zero and the high score was 52. The mean score is 26.219 (S.D. 11.67). Cronbach's alpha for the items in this scale is very similar to the previous one, .8445.

Lifestyle measure three. This measure is based on the standardized values of the 24 items. In SPSS (2000), I used the function "Descriptives", entered the 24 variables, and chose the option "save standardized values as variables". This created a factor score for each person, a standardized value for the person for all of the lifestyle items. Because the factor scores contained negative numbers, I added one plus the largest negative value ($1 + 1.98902 = 2.98902$) in order to shift all the values into the positive range. The range of this third lifestyle variable goes from 1-4.99, with a mean of 2.99 (S.D. 1).

The three measures of lifestyle are highly correlated with each other, as shown in Table 6-11. The data suggest that all three measures are reporting on the same domain.

Table 6-11. Pearson Correlations and Significance of the Three Lifestyle Measures (n=255)

	Lifestyle 1	Lifestyle 2
Lifestyle 2	.987 (.000)	
Lifestyle 3	.995 (.000)	.979 (.000)

The Cohen Self-Perceived Stress and the Life Events Scales

The Cohen's self-perceived stress scale asked people to rank themselves for four questions along a 3-point scale:

"In the last month, how often have you felt...

1. .. that you were really realizing your goals?
2. .. that you could solve the problems in your life?
3. .. upset or stressed (worn out, irritated)?
4. .. angry or frustrated because things happened you could not control?"

The three possible answers were: never, sometimes, and, almost every day

Scores on the Cohen Scale

Two hundred and fifteen people answered the four questions that made up the Cohen scale. This number is less than the total sample size because of problems discussed above with adjustments that had to be made to the scale (reducing the number of questions, and the number of answers) because of problems respondents had in answering the questions. See Table 6-12 for the answers to the four questions that constitute the Cohen scale.

Table 6-12. Percent of responses to the four questions on the Cohen self-perceived stress scale. (n=215)

Question	Never	sometimes	almost all the time	total
1. are realizing your goals	26.5%	50.7%	22.8%	100
2. able to solve problems in your life	22	56.5	21.5	100
3. feel upset or stressed	16.3	57.2	26.5	100
4. frustrated because you could not control things that happened	25.6	57.2	17.2	100

To create a global score on the Cohen self-perceived stress scale, three new variables were created. First the scores on the first two questions were inverted to reflect

how often a person **did not** feel that she or he was realizing his or her goals, or **did not** feel able to solve the problems in his or her life. This was done to make the scores agree with the last two questions in terms of directionality. Finally, the scores on all four questions were summed to give each person an overall score of self-perceived stress. Scores ranged from 4-12, with 12 equaling the highest level of self-perceived stress. See Table 6-13.

Table 6-13 Scores on Cohen scale. (n=215)

Score	Frequency	Percent
4	4	1.9
5	6	2.8
6	24	11.2
7	48	22.4
8	56	26.2
9	28	13.1
10	30	14.0
11	15	7.0
12	3	1.4

The Life Events Scale

The life events scale consisted of 18 events. Table 6-14 indicates the number and percentage of people who reported the event happening in his or her life within the previous year. The most commonly reported events were the death of a close friend, a new baby in the house, family conflict and having been seriously ill in the past year.

Table 6-14. Number and Percentage Reporting a Stressful Life Event.

Event	Number	Percent
Close friend died	92	35.2
New baby (in the house)	56	21.5
Family conflict	46	17.7
Was seriously ill	44	16.9
Moved to a new home	36	13.8
Death of a parent	25	9.4
Death of a sibling	25	9.4
Lost job	21	8.1
Spouse changed job	19	7.3
Have a new job	18	6.9

Table 6-14 continued.

Event	Number	Percent
Reconciled with partner	14	5.4
Child died	11	4.2
Divorced/separated	8	3.1
Got married	7	2.7
Death of a spouse	7	2.6
Finished school	5	1.9
Spent time in prison	4	1.5
Retired	4	1.5

(n=261)

The total score on the life events scale was calculated using the Life Change Units (LCU) from Miller and Rahe (1997). Each life event is assigned a different value according to the "estimates of their magnitude" (ibid-p. 279). Death of a spouse has the highest value of Life Change Units – 119, and finishing a degree has the lowest – 35. The LCU values were summed to arrive at the total score on the scale.

The total score on the life events scale ranged from 0-444. Fifty-five people have a score of zero because they did not report any of the events happening to them in the previous year. The modal score was 70 (n=27), the LCU value for a close friend dying. The man with the high score of 444 reported losing his spouse, a child, a sibling, and a parent, in the previous year.

Social Support

We measured social support in a number of different ways in the survey. We asked each survey participant about his or her religious affiliation, frequency of attendance at services, and whether or not she or he belonged to a smaller group (called a community) within the church or mosque. We asked the participant if she or he has *padrinhos* living in Beira, and which of his or her family members live in Beira. We asked about respondent's relations with neighbors, and if she or he had a close friend with

whom they could discuss intimate or personal topics. Finally, we asked each person to tell us to whom they would turn if faced with one of five situations (see below).

Religiosity

Table 6-15. Number and Percent of People Reporting Religious Affiliation

Religious affiliation	Number	Percent
Catholic	140	53.6
Protestant	64	24.5
Muslim	46	17.6
None	11	4.2

(n=261)

People who reported being Christian were asked how frequently they went to church. Of the 204 self-reported Christians in the sample, one quarter (25.5%) said that they do not attend church on a regular basis. Slightly more than half (52.4%) reported going to church on a weekly basis, with the balance saying that they attend more than once per week.

Muslims were asked whether they attended Friday prayers on a regular basis or not. Seventy-eight percent (n=36) said they go regularly to Friday prayers, and 22% (n=10) said they do not.

All respondents who reported being either Christian or Muslim were asked whether they belong to a smaller community of people within their church or mosque. Interviews and participant observation revealed that these communities were usually organized by neighborhood to allow members to have a small group of neighbors with whom to worship or turn to in a time of need. Of the 250 people who belong to an organized religion, 94 (37.6%) belong to a community (small group) within their church or mosque. Membership in a community was slightly more common for men (n=51) than for women (n=43).

***Padrinhos* and family living in Beira.**

We asked the participants if they had *padrinhos* living in Beira, either from baptism or marriage. Most commonly, people told us about marriage *padrinhos* because the ones from baptism had died or lived far away. Marriage sponsors are expected to play a role in helping a couple resolve disputes and give advice for a harmonious marriage. About 35% of the sample (n=90) reported having *padrinhos* living in Beira. Having *padrinhos* in Beira did not vary with age group, except for the oldest age group of age 60 and above.

We asked people to tell us which family members currently live in Beira. We coded this data into four groups: 0=none, 1=almost none/a few, 2=many, 3=almost all/all. Sixteen people (6.1%) reported having no family members living in Beira (outside of their household members). Twenty percent have at least a few family members living there, while the vast majority (73%) reported having many (40%) or nearly all (33%) of their family living in the city. There was no difference across the age groups in the amount of family members living in Beira. Family was cited most often in the interviews in phase one as the first choice of where to turn for social support.

Relationships with neighbors and having a close friend.

Neighbors were mentioned quite often in the phase one interviews about social support, both in a negative and a positive light. Most people stated that neighbors should not be trusted with personal issues such as marital or financial problems because they could not be trusted to keep it confidential. On the other hand, neighbors are seen as a good source of assistance with sudden medical problems, especially if they have a car to transport the sick person or family members to the hospital. They can also be counted on to participate in ceremonies for the death of a family member. We asked people whether

they had good relations with their neighbors, and the overwhelming majority said yes (86%). I doubt the validity of these responses, however, given the social desirability to project an image of getting along with people.

I have more confidence in the responses to the question about having a close friend. We asked people to tell us whether they have a close friend, one with whom they can discuss private or person matters. Most of the respondents took time to think over this question before giving an answer, and their responses seemed weightier. Nearly 62% of the sample ($n=161$) reported having a close friend. Men were slightly more likely to report having a close friend (65%), than women (59%). There was no significant difference across the age groups.

Consonance in social support

In addition to the above questions about social support, we asked participants to tell us how they would respond to five scenarios, who would they consult first, second, and so on. The five scenarios were: borrowing money, illness in the family, problems with a partner, conflict at work or at school, and death in the family.

The sample size responding to each of the scenarios varies greatly. Twenty-three people did not give a response to the question about borrowing money, usually because they said they do not borrow money from anyone or there is no one they would borrow from. Eleven respondents could not think of anyone they would turn to in case of illness of a family member. Only six people could not provide us with an answer for the last scenario, the case of a death in the family.

A higher percentage of people did not give a response to the other two scenarios. Forty-seven did not say who they would turn to for help in resolving a problem with their spouse, either because they are not married, or they do not ask anyone for help with this

type of problem. The highest number (59) did not reply to the scenario about what they would do in case of problems at work or at school, usually because they do not work or go to school.

Table 6-16 Frequency of First Choice for the Five Scenarios

	Death in the Family	Conflict at Work	Problem with Partner	Family Member Sick	Borrow Money
Family	133 (52.2%)	78 (38.6)	140 (65.4%)	115 (46.3%)	110 (46.2%)
Neighbors	18 (7.1%)	6 (3%)	8 (3.7%)	80 (32.%)	16 (6.7%)
Friends	17 (6.7%)	26 (12.9%)	15 (7.0%)	22 (8.8%)	49 (20.6%)
Boss/job	29 (11.4%)	50 (24.8%)	3 (1.4%)	14 (5.6%)	52(21.8%)
Government agency	1 (0.4%)	5 (2.5%)	0	1 (0.4%)	4 (1.7%)
Colleague	3 (1.2%)	35 (17.3%)	1 (0.5%)	6 (2.4%)	2 (0.8%)
<i>Padrinhos</i>	1 (0.4%)	0	33 (15.4%)	0	0
<i>Conterraneos</i>	4 (1.6%)	0	1 (0.5%)	0	0
Church/Mosque	49 (19.2%)	2 (1.0%)	13 (6.1%)	12 (4.8%)	5 (2.1%)
Total	255	202	214	250	238

Borrowing money

Following the model for social support elaborated in phase one, most people (46.2%) turn first to their family members when they need to borrow money. Almost equal numbers look to their work (20.6%) to give them an advance on their salary as turn to a friend (21.8) for a loan. Most of the respondents qualified the latter as having to be a very close friend. Other first choice options were neighbors, church or mosque, a bank, or a coworker.

Nearly equal numbers of people listed family, friends, or work as their second choice for borrowing money. Other sources of social support mentioned in second place were neighbors, colleagues, *padrinhos*, church/mosque, and bank. Only 153 people (59%) gave a second choice option for this scenario.

When a family member is sick the cultural model indicates that family and friends are the most appropriate people to turn to first. In this case, neighbors are judged to be useful if they have transportation or if they are simply closer at hand. Most of the respondents said that they rely on family (46%) or on neighbors (32%) when a family member is sick.

Respondents reported that problems with spouse or partner are usually resolved within the family first (65%) or by turning to the *padrinhos* (15%). The results are in accordance with the cultural model elicited in phase one of relying on these two groups, and rarely taking the problem to others.

To resolve conflict in the workplace or at school people reported turning to their family members, the boss/supervisor, or to a coworker or schoolmate. Other options reported include friend, neighbor, church/mosque, and government agency.

We had the most responses to the scenario about death in the family, and several respondents remarked that this is a time when your social support network is working at full force. There was a marked preference for the family to be primarily involved, with friends, coworkers, and the religious community lending their assistance. The role of the employer is usually to provide transportation and/or financial assistance.

I coded each person's set of responses (we had up to four per question) for each scenario according to how well it matched the culturally appropriate model of social support developed in phase one. Each respondent was given a score between 1-5 for the scenario, with a score of five meaning that his or her responses matched the model perfectly. If their answers did not match the model exactly but they listed the categories that were in the model, they were given a 4, and so on. A score of 1 was given to

individuals who listed no one or categories of people who were considered to be inappropriate according to the model developed in phase one and described in Chapter 5. I coded the three scenarios that had the most responses from a representative sample, (borrow money, someone sick in the family, death in the family). Then, I summed these scores to have an overall score of how well an individual's social support matched the cultural model. These summed scores ranged from 5-15.

Blood Pressure Measurements

Methods and values

As described above, I measured the blood pressure measurements of each respondent three times. The three measurements were summed, and mean diastolic and systolic pressures were calculated for each person. These mean values were used in most of the analyses described below.

Table 6-17. Values of Three Measurements of Systolic and Diastolic Blood Pressure.

	Minimum	Maximum	Mean	Standard Deviation
Systolic 1	80	250	127.75	26.33
Systolic 2	82	260	127.57	26.42
Systolic 3	80	231	127.21	26.12
Mean Systolic	82	246	127.51	25.79
Diastolic 1	55	170	80.79	13.46
Diastolic 2	50	160	80.93	13.89
Diastolic 3	52	150	80.39	13.54
Mean Diastolic	56	160	80.70	13.14

(n=261)

The range in blood pressure readings was broad. Looking at the mean scores in Table 6-17, the minimum systolic pressure is 82, while the highest reading was 246. Similarly, the lowest mean diastolic value is 56, and the highest 160.

Hypertensives

When I defined high blood pressure as a mean systolic pressure greater than 140 and a mean diastolic pressure greater than 90, then 45 respondents (17%) had high blood pressure. With the definition of mean systolic pressure greater than 140 or mean diastolic greater than 90, the number of people with high blood pressure is 74 (28.4%). Looking at each measure separately, 50 people (19.9%) had a mean diastolic pressure greater than 90, and 67 individuals (25.7%) had systolic pressure greater than 140.

Men made up a disproportionate share of hypertensives, using either definition. Of the 45 hypertensives using the strict definition, 27 are men (60%) and 18 are women. The sex breakdown for the second definition of hypertensive is similar. Fifty-eight percent ($n=43$) of the 74 people in this group are men. This apparent sex difference disappears when I correlated blood pressure by sex but controlled for age. The hypertensive men are older.

Because I did not collect a random sample of the population of Ponta Gea, these number cannot be generalized to the neighborhood, much less to the entire city of Beira. For my sample of adults, however, a significant number of people (45 or 74) had high blood pressure. We can examine, then, the relative contribution of risk factors for this population's variation in blood pressure.

Predicting Blood Pressure

Bivariate equations

In this next section I present the primary variables of interest and blood pressure in bivariate equations.

Table 6-18. Bivariate Correlations and Significance of Blood Pressure with Sex, Age and BMI (n=261)

	Systolic BP	Diastolic BP
Sex	-.087 (.163)	-.065 (.299)
BMI	.200 (.001)	.284 (.000)
Age	.383 (.000)	.216 (.000)

Table 6-18 shows that body mass index is, as expected from world-wide data, significantly correlated with both diastolic and systolic measures of blood pressure. Men have higher systolic and diastolic blood pressure than women in bivariate regression equations, although the difference is not statistically significant. (Men are coded as 0 and women are coded as 1, giving the negative correlation.) Blood pressure rises with age and this association is statistically significant, as expected.

Family History of Hypertension

Seventy-two percent of the sample told us that a relative had been diagnosed with hypertension, living or dead. When we asked who the person was, we were told about first and second degree blood relatives, as well as people related by marriage. I coded the data according to which relative suffered from hypertension into two variables, first-degree relatives (parent, sibling, child), and second-degree relatives (aunt/uncle, cousin, grandparent).

More than 46% of the sample (n= 121) reported a first-degree relative suffering from high blood pressure, and 12.6% reported a second-degree relative. The rest of the reports of a relative with high blood pressure were kin related through marriage, usually a spouse or mother-in-law. Reporting a first-degree relative with high blood pressure was not associated with systolic or diastolic blood pressure for the respondent. Nor was it a significant predictor in regression equations (including age and BMI) to predict diastolic

or systolic blood pressure. According to the literature, first-degree family history of hypertension is often predictive of hypertension in the respondent.

Table 6-19. Blood Pressure Mean and Standard Deviation of People Reporting or not Reporting a First Degree Relative with High Blood Pressure.

First degree relative	Mean Diastolic (standard deviation)	Mean Systolic (standard deviation)
No (n=140)	80.64 (12.69)	128.51 (25.46)
Yes (n=121)	80.78 (13.68)	126.36 (26.22)
Total (n=261)	80.70 (13.14)	127.51 (25.79)

Lifestyle

Table 6-20 presents the correlation of the three lifestyle scores, income and education with both measures of blood pressure. All three are significantly associated with diastolic but not systolic blood pressure.

Table 6-20. Lifestyle Scores, Income and Education Correlated with Blood Pressure

		Systolic BP	Diastolic BP
Lifestyle 1	Pearson Correlation	.041	.127
(n=255)	Significance (2-tail)	.512	.043
Lifestyle 2	Pearson Correlation	.042	.122
(n=255)	Significance (2-tail)	.507	.051
Lifestyle 3	Pearson Correlation	.051	.134
(n=255)	Significance (2-tail)	.415	.033
Income	Pearson Correlation	.042	.168
(n=242)	Significance (2-tail)	.517	.009
Education	Pearson Correlation	-.101	.013
(n=261)	Significance (2-tail)	.104	.829

Income also significantly predicts diastolic but not systolic blood pressure. The positive connection between income and blood pressure was expected, given this overall pattern in other African samples.

Education level is not significantly correlated with either measure of blood pressure. Interestingly, the effect of education on diastolic pressure appears to be the opposite of its effect on systolic pressure, although the former is quite weak.

Perceived stress and blood pressure

The Cohen perceived stress score did not predict either diastolic or systolic blood pressure in the sample in bivariate analyses. In multiple regression equations, including age and BMI, the Cohen scale did not account for any of the variance.

I wanted to test the relationship between income and perceived stress, so I put them into a linear regression equation. Income significantly predicts the Cohen score ($\beta = -.137, p = .05$). People with higher income have lower perceived stress. I wanted to see if sex, age, race, or household size predicted the Cohen score, but none of them did.

Life events and blood pressure

None of the individual life events predicted systolic or diastolic blood pressure. The total score for the life event scale (sum of all the Life Change Units for the reported life events) was not predictive of blood pressure in bivariate models. In fact, the slope is negative for both diastolic and systolic blood pressure.

Social support, lifestyle, and blood pressure

Table 6-21 presents blood pressure values by religion.

Table 6-21. Mean Blood Pressure and Standard Deviation by Religion.

Religion	Diastolic	Systolic
Catholic (n=140)	80.23 (14.79)	127.57 (28.67)
Protestant (n=64)	80.34 (11.76)	125.87 (22.23)
Muslim (n=46)	82.43 (8.91)	128.75 (22.75)
None (n=11)	81.55 (14.12)	131.21 (19.76)
Total (n=261)	80.70 (13.14)	127.51 (25.79)

It appeared that Muslims have slightly higher blood pressure, so I created a new variable to test this. I added the dichotomous variable (Muslim or not) to a regression equation including age and BMI. The variable "Muslim" did not predict either systolic or diastolic blood pressure. I wanted to see if religiosity (frequency of attendance at church

or mosque) served to lower blood pressure. I put each variable into a regression equation with age and BMI, and neither church nor mosque attendance had any predictive value of systolic or diastolic blood pressure.

I made a composite variable of the following indicators of social support; membership in a religious community, having a close friend, amount of family members in Beira, having a *padrinho* in Beira, and having good relations with your neighbors. When this variable was added into a regression equation (along with age and BMI) to predict blood pressure it significantly predicted systolic blood pressure ($p = .035$), but not diastolic blood pressure ($p = .217$). As the measure of social support increased both measures of blood pressure decreased.

Because of the relationship between income and perceived stress mentioned above, I wanted to see if income was associated with social support, i.e., if poorer or wealthier people have better social support. I found no association between income and social support.

As described above, I created a new variable reflecting the ability of each individual to access culturally appropriate social support. For this variable, I coded their responses to questions about three scenarios (borrowing money, and illness or death in the family). Higher scores on this variable reflect social support that is closest to the cultural model, or more consonant.

In bivariate equations this measure of social support is correlated weakly with diastolic and systolic blood pressure. Interestingly, the association is positive, meaning that the higher a person's ability to access culturally appropriate social support, the higher their blood pressure. I wanted to investigate the relationship between income and social

support to see if wealthier people have better social support. The slope of the line is completely flat and the significance is .99.

Multivariate Regression

I begin by predicting blood pressure using multivariate linear regression, using the known risk factors for hypertension and other demographic variables. Then, I add in the measures of psychosocial stress (Cohen, Life Events, three measures of lifestyle, three measures of mobility), and the indicators of social support.

The first equation includes age, BMI, and sex, which are significant predictors of diastolic blood pressure (DBP) in bivariate analyses. DBP is positively and strongly predicted by age and BMI, the relationship predicted in the blood pressure literature. Being male is also associated with higher DBP (male=0, female=1, hence the negative slope).

I added income into the variable list for the second equation. Age and BMI remain strong predictors of DBP. Income is not a significant predictor of DBP, and its inclusion also lowers the significance of sex.

This highlights a couple of problems with the variable INCOME. Men report higher incomes, by about \$40 per month, a significant amount where the average income is \$234 per month. Income represents total household income, so the difference in the sex of the respondent should not matter. In reality, men know what the household income is more often than the women. Remember that about 8% of the sample did not report a household income due to privacy or just not knowing what it is.

Because income and BMI are strongly correlated (.001), I decided to leave BMI out of the third equation. Interestingly, the predictive strength of age increases, income becomes significant, and sex is not significant.

In equation 4, I added education into the variable list, even though I do not expect it to have any predictive value. The problem with this equation is that many of the variables are strongly interrelated: men have more education and report more income, and BMI goes up with education, income, and age. Because of this, I decided to include age and BMI in the rest of the analyses. These two factors are strong and consistent predictors of DBP in my sample, in accordance with other studies of blood pressure around the world.

Table 6-22. Four regression equations to predict diastolic blood pressure, Slope and (significance).

Variable	Equation #1	Equation #2	Equation #3	Equation #4
Age	.172 (.004)	.171 (.006)	.209 (.000)	.159 (.015)
Sex	-.133 (.032)	-.118 (.075)	-.021 (.740)	-.134 (.057)
BMI	.309 (.000)	.271 (.000)		.273 (.000)
Income		.097 (.122)	.163 (.010)	.116 (.092)
Education				-.050 (.494)

I repeated these equations to predict systolic blood pressure (SBP); the results are shown in Table 6-23. Age and BMI continue to have strong predictive value. Being male is not a significant predictor of SBP. Income and education are not predictive of SBP.

Table 6-23. Four regression equations to predict systolic blood pressure.

Variable	Equation #1	Equation #2	Equation #3	Equation #4
Age	.353 (.000)	.338 (.000)	.367 (.000)	.318 (.000)
Sex	-.098 (.105)	-.102 (.113)	-.028 (.641)	-.128 (.061)
BMI	.201 (.001)	.206 (.002)		.210 (.001)
Income		-.016 (.795)	.034 (.575)	.015 (.824)
Education				-.081 (.254)

Adding in psychosocial stress

I began this analysis with the Cohen scale, the life events scale and then the three measures of consonance with lifestyle. The Cohen score of self-perceived stress was not predictive of either systolic or diastolic blood pressure. Strangely, the slope for the Cohen

score in both equations is (mildly) negative, indicating that the higher the Cohen score, the lower the blood pressure.

Table 6-24. Predicting Blood Pressure with Age, BMI, and the Cohen Self-Perceived Stress Scale.

	Systolic Blood Pressure	Diastolic Blood Pressure
Age	.358 (.000)	.174 (.000)
BMI	.172 (.008)	.269 (.000)
Cohen score	-.015 (.818)	-.051 (.433)

Table 6-25. Slope and Significance of Blood Pressure with Age, BMI and the Life Events Scale (n=260).

	Systolic Blood Pressure	Diastolic Blood Pressure
Age	.369 (.000)	.194 (.001)
BMI	.168 (.004)	.266 (.000)
Life events score	-.020 (.729)	-.014 (.807)

None of the measures of cultural consonance with lifestyle predicted diastolic or systolic blood pressure in the equations. See Tables 6-26 and 6-27. All three measures of consonance with the lifestyle model appear to be measuring the same domain, but are not predictive of blood pressure. The slopes of the lifestyle measures are positive.

Table 6-26. Predicting Diastolic Blood Pressure with Age, BMI and Three Measures of Lifestyle.

	Equation #1	Equation #2	Equation #3
Age	.192 (.001)	.192 (.000)	.191 (.001)
BMI	.258 (.000)	.260 (.000)	.258 (.000)
Lifestyle 1	.038 (.543)		
Lifestyle 2		.032 (.606)	
Lifestyle 3			.037 (.559)

Table 6-27. Predicting Systolic Blood Pressure with Age, BMI and Three Measures of Lifestyle.

	Equation #1	Equation #2	Equation #3
Age	.369 (.000)	.369 (.000)	.369 (.000)
BMI	.818 (.003)	.181 (.003)	.182 (.003)
Lifestyle 1	-.029 (.631)		
Lifestyle 2		-.031 (.608)	
Lifestyle 3			-.032 (.604)

I suspected that BMI and the consonance with lifestyle scale were measuring the same thing. So, I did bivariate comparisons of BMI and the three measures of lifestyle (see Table 6-28). There is a strong correlation between BMI and cultural consonance with lifestyle in this sample, the opposite result that Dressler has found in the U.S. and Brazil. He found that dissonance with the cultural model of lifestyle was associated with increased BMI. In my data, however, people who are consonant with the lifestyle model have higher BMI. This is consistent with the African pattern of wealthy people eating well and doing limited physical activity.

Table 6-28. Lifestyle and BMI (n=255) Pearson Correlation and (significance).

	Lifestyle 1	Lifestyle 2	Lifestyle 3
BMI	.317 (.000)	.314 (.000)	.329 (.000)

I decided to regress consonance in lifestyle and age against blood pressure, leaving out BMI. In these simplified equations, the lifestyle consonance measures are significant predictors of diastolic, but not systolic, blood pressure (.05).

Adding in social support

In the bivariate analyses, the two measures of social support had opposite effects on blood pressure. The composite measure of membership in a religious community, having family, *padrinhos*, or a close friend in Beira, and good neighborly relations was negatively correlated with blood pressure. This relationship is what is expected if social support buffers people from psychosocial stress or allows them to cope better with it. The score of people's answers to three of the five scenarios (cultural consonance with the cultural model of social support) had a positive relationship with blood pressure, however.

I wanted to test if these two measures of social support could predict blood pressure in an equation with age and BMI. Tables 6-29 and 6-30 and report the results of this multivariate regression.

Table 6-29. Age, BMI, and Composite Measure of Social Support. (n=248)

	Systolic Blood Pressure	Diastolic Blood Pressure
Age	.369 (.000)	.208 (.001)
BMI	.180 (.002)	.292 (.000)
Composite	-.122 (.035)	-.074 (.217)

Table 6-30. Age, BMI and Cultural Consonance in Social Support (n=260)

	Systolic Blood Pressure	Diastolic Blood Pressure
Age	.378 (.000)	.202 (.001)
BMI	.158 (.006)	.255 (.000)
Social Support	.084 (.142)	.085 (.153)

I found a pattern similar to what emerged in the bivariate equations. Consonance with the cultural model of social support, as determined through the scenarios, has a positive slope and does not significantly predict blood pressure. The composite measure of social support has a negative slope, and significantly predicts systolic blood pressure.

Lifestyle and Social Support to Predict Blood Pressure

Here I combine AGE, BMI, consonance with lifestyle, and social support into one model. Because the three measures of consonance with the lifestyle model are all measuring the same thing, I decided to use the second lifestyle measure (weighted according to the ranking scores) for these analyses. I first included the social support score derived from the scenarios, and later the second composite score of social support.

Table 6-31. Lifestyle, Social Support and Systolic Blood Pressure.

	Beta	Significance
Age	.366	.000
BMI	.193	.002
Lifestyle	-.018	.774
Social Support	-.130	.027

Table 6-32. Lifestyle, Social Support and Diastolic Blood Pressure.

	Beta	Significance
Age	.205	.001
BMI	.283	.000
Lifestyle	.053	.401
Social Support	-.085	.157

The measure of consonance in the social support variable does not predict lower blood pressure. On the contrary, the slope indicates that having good social support leads to higher blood pressure, although this is not significant. This is extremely odd, especially because the measure of social support I created, based on participant observation, indicates the opposite trend. In this analysis, I used the composite score, discussed below. Perhaps the scale based on the social support scenarios needs to be reformulated or expanded to include the two scenarios that were excluded because they had too few cases.

When the composite score of social support is added into the equation with lifestyle, age and BMI, it continues to lower blood pressure, and here the result is significant (Tables 6-33 and 6-34). People with more family members and/or a *padrinho* in town, who belong to a religious community, who have a close friend, and who have good relations with their neighbors have lower systolic blood pressure. The lifestyle measure does not predict blood pressure when it is a variable in these multivariate equations.

Table 6-33. Lifestyle, Consonance in Social Support and Systolic BP

	Beta	Significance
Age	.378	.000
BMI	.170	.006
Lifestyle	-.041	.502
Scenarios	.097	.098

Table 6-34. Lifestyle, Consonance in Social Support and Diastolic BP

	Beta	Significance
Age	.201	.001
BMI	.248	.000
Lifestyle	.087	.148
Scenarios	.029	.639

Variation Explained

Finally, these analyses allow us to address, at least partially, the question posed by the title of my dissertation: How much of the intracultural variation in blood pressure is accounted for by factors related to psychosocial stress? The three variables AGE, SEX, and BMI account for 13.5% of the observed variation in diastolic blood pressure, and 18.9% for systolic blood pressure. When LIFESTYLE is added into the regression equation (in another model) there is no change in the variation in diastolic blood pressure (DBP) explained, and it accounts for just 0.2% of the variation in systolic blood pressure (SBP). The composite variable for social support explains 0.5% of the variation in DBP, and 1.5% for SBP. These findings are discussed below, in Chapter 7.

CHAPTER 7 CONCLUSION

A Review of the Findings

From the data gathered in this project, the people of Ponta Gea exhibit strong variation in blood pressure. What explains this variation? I begin this chapter by reviewing the results reported in the previous chapter, comparing them to data from Brazil and the U.S., and discussing how they disproved or failed to disprove the hypotheses presented in Chapter 4. Then, I discuss how my findings can be understood in the Mozambican cultural context and the implications of this research for anthropology and for public health.

Age and BMI have been proven time and time again to explain a good part of the variation in blood pressure. In my data from Ponta Gea, age, sex, and BMI explain about 14% of the variation in diastolic blood pressure and just over 20% of systolic blood pressure. William Dressler reports that the same three variable account for 28.2% of the variance in systolic blood pressure in Brazil, and 12.5% of systolic blood pressure in Tuscaloosa, Alabama (Dressler pers. comm.).

Having a close family member with high blood pressure is often cited as a risk factor for hypertension. In my research, people reported whether, to the best of their knowledge, a family member suffered from high blood pressure. The data I collected does not show an association between a family history of hypertension and elevated blood pressure in the person. It is difficult to collect accurate information about the health of family members in the type of door-to-door survey I did. I believe that many people

we interviewed do not know whether a close family has (or had) hypertension because many of their relatives do not even know themselves. In the sample I interviewed, 73% of the people whom we found to have high blood pressure had previously responded yes when asked if they have high blood pressure. Another fifty-one people told us they had high blood pressure, but when I measured it, it was below the cut-points.

Consonance with lifestyle predicts diastolic but not systolic blood pressure. I expected that people who live closer to the model of a successful lifestyle developed in phase one would have statistically higher blood pressure. This was, in fact, the case, but consonance in lifestyle explains none of the variance for DBP and just 0.2% for SBP. In Brazil and in Alabama, Dressler (pers. comm.) reports that consonance in lifestyle explains more of the variance in blood pressure, 3.4% and 1.0% for SBP respectively.

When I measured social support using the scenarios, the results were inconclusive and not significant. I created a composite social support scale based on what I was told and saw during the ethnographic stage of the research. This composite scale of five measures of social support (e.g., having family near by and degree of religiosity) does appear to measure a domain that has a buffering effect on blood pressure. It explains 1.5% of the variation in SBP and 0.5% for DBP. In his most recent study in Brazil, Dressler found that social support explains more than 4.5% of SBP and just over 1.0% for DBP.

The most important element of the composite scale for Ponta Gea was the question about having a good friend. Simply having a friend accounted for 0.3% of the variation in blood pressure, lowering an individual's blood pressure significantly. This finding is consistent with the extensive work done by Berkman (cf., 1977, 1983) and

others on the positive health impact of good social support. Two published scales of psychosocial stress (Cohen self-perceived stress and the life events scale) do not significantly predict blood pressure in my sample. This confirms that these scales are not a good measure of psychosocial stress in populations other than the ones in which they were developed and validated.

Lack of Expected Associations

Direction of the relationship

Blood pressure is not associated with cultural consonance in lifestyle in the same direction that Dressler found in Brazil and in the U.S. This is in line with findings from Africa, where blood pressure positively associated with wealth. As I pointed out in Chapters 1 and 3, blood pressure increases with wealth in most countries in Africa (with the exception of some populations in South Africa), but it decreases with wealth in the western hemisphere.

The John Henry scale

The John Henry scale of Active Coping was dropped from the survey questionnaire for two reasons. Respondents were having difficulties in choosing one answer along the Likert scale and their answers were subject to the social desirability of the questions being asked. Among the first 40 respondents who completed the twelve questions that make up this scale, almost all of them scored between 55 and 60 on the sixty-point scale. These high scores could indicate that most people were employing active coping, or that they were giving the answers they thought we wanted to hear. I believed it was the latter and dropped the scale.

Discussion

The results indicate that consonance with the cultural model of a successful lifestyle is stressful, when stress is measured by blood pressure. This positive relationship between consonance in lifestyle and blood pressure is the opposite of what Dressler hypothesizes, and what his research suggests. In Brazil, dissonance with the lifestyle model is stressful in terms of blood pressure. This brings up the question of why should it be stressful in Mozambique to live the way that most people want to live? Dressler does not use the term "ideal lifestyle," but I believe that my model of the successful lifestyle could be called the ideal lifestyle for that setting. So, why would people who live the ideal lifestyle have more stress in their lives? Increasing income is associated with increasing diastolic blood pressure, after controlling for age and body mass index, and income accounts for 2% of the variance in blood pressure, in addition to the effects age (12%) and BMI (17%). This is, as noted, the opposite of the association found among African Americans and Brazilians income and blood pressure.

If blood pressure is a proxy for stress, why is it stressful for Mozambicans to be wealthy and not for African Americans and Brazilians? First, if you are wealthy, members of your extended family – and even people who are not members of your family – look to you for help. Second, you cannot be sure how long you can maintain the high status that comes with wealth. And third, under conditions of poverty, a successful lifestyle is highly visible and subject to envy and/or criticism. I have not been able to find published literature that argues this point, but it is clear from my observations and interviews.

One informant told me, "a wealthy person may have a lot of money, but he has to help a lot of people who come to him asking for money; his family, workers, and others".

She continued, suggesting ways to help people reduce their stress level: "for wealthy people, it is hard to convince them to reduce stress in their lives. One thing you have to do is to keep your family from begging from you. Give them a little bit of money and tell them to start a business and then live off of it" (interview 7). Another person observed, "it's hard to hold onto what you already have. [A rich person] has a lot, but also worries a lot and can suffer from *tensão alta*. He doesn't want to lose his status" (interview 4). The stresses go beyond obligations to friends and family. "Well, everyone has problems, even rich folks. Maybe they worry about their business or if they owe money to a bank and can not pay, or the bank will not give them a loan" (interview 11).

The road to wealth can also be stressful and may contribute to ill-health, according to the semistructured interviews from phase one. "Rich people have a good life, but I guess they have worries too. Ambitions can cause rich people to be sick or be worried (interview 9). "If you think too much or force yourself too much then you can get sick. You can also get thrombose. Rich people also can have heart problems or cancer too" (interview 10).

It appears that the consonance in lifestyle scale developed for Mozambique is not measuring the same thing as the scale Dressler developed in Brazil. It may be measuring style of life in both population, but it is not measuring stress in the same way. A similar situation presents itself with regards to the Cohen Self-Perceived Stress Scale and the Holmes and Rahe Life Events Scale. Both were developed on Western populations and have not been extensively applied to non-western settings. It was easier for the respondents to answer the questions that constitute the recent life events scale but validity is still an issue.

Participants had trouble answering the questions on the Cohen scale even though we made several attempts to adapt it for their case in answering. The response options were reduced from five to three, and the number of questions decreased from ten to four. Still, most of the people seemed to be giving an answer simply to be able to move on in the interview, which was not the case on most of the other questions. I have little faith that their answers were well thought out or accurately reflected the amount of stress they perceive in their lives.

As I mentioned earlier, we encountered problems with the many of the respondents' inability to understand and respond appropriately to questions using Likert scales (Kennedy and Barkey n.d.). I dropped the John Henry scale and had to adapt the Cohen scale. Often, scales developed to evaluate an individual's state of mind or perceptions rely on this format. It is my experience, (in this study and others), that people who are not accustomed to the Likert format do not provide meaningful answers. This is not because they are unwilling to be truthful or cooperative, but because they are unfamiliar with ranking their feelings or squashing their perceptions into pre-ordained categories.

The Mozambican Context

At this point I want to return to the genesis of this research. I originally went to Mozambique in 1999 to assess the long-term impact of war trauma on health. I was told repeatedly that the main source of stress in people's lives stemmed not from their wartime experiences but from the profound changes in their social and economic realities since the end of the war. Many of the people I interviewed during this visit made the link between these changes, stress, and blood pressure. The term they used is *tensão alta*,

which may or not be the equivalent of clinical hypertension. It may in fact be more similar to *nervios* in Spanish-speaking populations (Guarnaccia 1993).

I am convinced that a segment of the population is suffering a form of psychosocial stress because of the recent structural and social changes in Mozambique. What is less clear is whether we can measure that change using the scales we currently have at our disposal or whether blood pressure is the best way to evaluate this stress. The Mozambicans I spoke with and observed feel and recognize that something is wrong and that it is making them feel unwell. Having done that, the responsibility shifts to the researcher to pinpoint the sources of the stress, how they can be measured, and the effects they are having on physical or mental health.

The research problem explored here was suggested by people during my initial visits to Mozambique. This is one strength of the study, but there is one aspect of it that troubles me. I may not have fully understood the situation that was being described, owing to cultural gaps and the use of terminology that I may not have fully understood. What if I failed to understand exactly what was going on or what people were describing to me? If a Mozambican social scientist had helped me to define psychosocial stress and social support, and had worked together with me to operationalize these constructs, then she or he could have drawn on emic and etic understandings of the situation.

The field of cross-cultural psychology can provide assistance in understanding the type of stress Mozambicans are experiencing and also the appropriate tools with which to measure. It is possible that the stress being felt and described is along the lines of anxiety and "nerves", rather than changes in blood pressure. In the semi-structured interviews and in the survey, I asked people to describe the symptoms of *tensao alta*. Many of the

symptoms could easily be used to describe a case of anxiety, depression, or *nervios* (Guaranaccia 1993).

Future Research

The research described in this dissertation builds on work by Norman Scotch (1963a and b), John Cassel (c.f., Cassel and Tyroler 1961, Cassel 1976), and William Dressler, among others, in assessing the impact of modernization and social change on health status. It explicitly uses Dressler's methods and theories regarding consonance in lifestyle and social support, and applies them to a continent where they had not been tested previously. My results do not replicate Dressler's findings, yet they expand our knowledge about and approach to these topics. The model he has proposed can be expanded or revised to include the information from this African population.

It is time to develop new methods with which we can measure psychosocial stress and social support cross-culturally. It is clear to me that the existing methods do not measure these two constructs in the population I was working with. I think that it is preferable at this point in time to begin from scratch to create these methods. I do not want to ignore the important work that has been done in these areas, but I question the applicability of scales and questionnaires from one setting to another, especially given the sensitive nature of these constructs. I advocate basic research into the meanings of stress and social support in various populations as the first step. We may find that stress and social support are so highly culture-dependent that one tool or suite of methodological tools may be salient in one culture but not elsewhere.

Methods also need to be developed to measure the relationship between lifestyle and blood pressure in a population where we see blood pressure increasing with income. The goal here is to identify the mechanism(s) through which income leads to increasing

blood pressure. These new tools would isolate the independent effects of income from the effect of income on obesity and high blood pressure.

One topic I have discussed with colleagues in the field is the possibility of a transition point at which blood pressure stops increasing with income and begins to decline. It could be analogous to the epidemiologic or demographic transitions occurring throughout the world with modernization. A population might reach a certain point during acculturation or modernization at which the directionality of blood pressure and income becomes inverted. Knowing that most African countries exhibit the opposite pattern from African diaspora populations in the U.S., the Caribbean, and South America, I wonder where the change occurred in the latter populations.

South Africa would be an excellent place to test new measures of psychosocial stress, social support and consonance with lifestyle. This country is home to several African populations who have already undergone the transition in blood pressure and socioeconomic level described in the last paragraph. It is a highly modernized country on the African continent that is home to many different ethnic groups. Within these groups there is diversity in level of acculturation and urbanization. There is baseline data on blood pressure collected by researchers and an interest in the contribution of social factors to the development of disease.

Applications of the Research

In the field of anthropology, this research contributes to our understanding of culture change and its effects on health. Methodologically, it will help assist in the testing of existing tools, and the development of new ones, to measure psychosocial stress cross-culturally.

The study makes two contributions to the domain of public health. The information on age, BMI, income, and other variables will be helpful to efforts to combat the increasing burden of chronic disease in Africa, specifically cardiovascular disease. I hope that the research findings will also help us to understand hypertension better in African-Americans.

The results of this study indicate that the contribution of cultural consonance in lifestyle and social support to the development of hypertension in Africa is minimal. There are two possible explanations for this. One is that we simply do not have tools with which to measure cultural consonance in Africa. Another possibility is that cultural consonance contributes less in Africa to blood pressure than it does in other parts of the world. In either case, we need better tools for measuring culturally appropriate levels of consonance with sought-after lifestyles and for measuring other potential sources of psychosocial stress. As these tools are developed, the results they generate will be applicable to the study of hypertension, not only in Africa, but also around the world.

APPENDIX A LEGEND AND MAP OF PONTA GEA

Legend:

- | | |
|--|---|
| 1. DANMO Garage | 36. German Cooperation (GTZ) |
| 2. Sport Pavilion | 37. SISE (Intelligence Service) |
| 3. School for Handicapped Children | 38. Former NGO Offices |
| 4. E. Mondlane Primary School | 39. National Institute for the Blind |
| 5. City Education Office | 40. Bairro Secretary's Office |
| 6. Zimbabwean Consulate | 41. Ponta Gea Market |
| 7. Marriage Palace | 42. May 1 st Teacher's Housing |
| 8. Oceana Bar and Restaurant | 43. Professor Housing |
| 9. Miramar Restaurant | 44. Nursery School (Crèche) |
| 10. Miramar Hotel | 45. Mozambique Red Cross |
| 11. Airplane Park | 46. Military Camp |
| 12. Pensao Moderna | 47. Snack Bar |
| 13. Provincial Library | 48. Police Station |
| 14. Worker's Union (ex-clinic) | 49. Traffic Police Station |
| 15. Universal Kingdom of God Church | |
| 16. World Food Program / U.N. | |
| 17. Golf Club | |
| 18. Ponta Gea Hospital | |
| 19. Meteorology Station | |
| 20. Hotel Savoy | |
| 21. Government Garage | |
| 22. Diocese Offices | |
| 23. Gas (Petrol) Station | |
| 24. ANDEL (NGO) | |
| 25. Greek Church | |
| 26. Provincial Office of Agriculture and Rural Development | |
| 27. Bank Offices | |
| 28. Beira Sports Club | |
| 29. Mozambique Railroad Housing | |
| 30. Beira Corridor Housing | |
| 31. Platform for the Pope's Mass | |
| 32. Mozambique Association to Fight Against AIDS | |
| 33. UP Professor Housing | |
| 34. Mormon Church (LDS) | |
| 35. Ponta Gea Primary School | |

**Cidade da Beira
Bairro da Ponta - Géa**



INSTITUTO GEOGRÁFICO NACIONAL
Linha de 1:50.000
Escala: 1:50.000
Folha: 1:50.000

APPENDIX B
LIFESTYLE ITEMS FROM TWENTY TWO FREELISTS

Table B-1 Complete list of lifestyle items.

	Number of Listings	Average percent	Average rank	Smith's S
Car	16	73	5.875	0.503
Own a house	15	68	2.467	0.597
Travel outside Beira	13	59	10.385	0.197
TV	12	55	7.25	0.318
Children to private school	11	50	10.727	0.207
Refrigerator	8	36	6.625	0.234
Private health care	7	32	6.143	0.203
Cellular phone	7	32	13.143	0.102
Satellite TV	7	32	9.714	0.158
Good Job	7	32	2.571	0.275
Freezer (free-standing)	7	32	7.857	0.181
Have a maid	7	32	10.286	0.128
Electricity	7	32	7.571	0.187
Stereo system	7	32	6.571	0.199
Telephone	7	32	10.143	0.163
Running (piped) water	6	27	9.667	0.145
Air Conditioning	6	27	6	0.166
Video player	6	27	7.333	0.154
Philanthropy	6	27	10.167	0.101
Speak some English	6	27	11.333	0.088
Speak Portuguese at home	6	27	13.33	0.064
Stove (not hot-plate)	6	27	5.833	0.172
Eat out in restaurants	5	23	11.4	0.106
Matching furniture set	5	23	6.4	0.155
Mixed Portfolio	5	23	6.2	0.151
Enough money	5	23	4	0.165
Girlfriend (Mistress)	4	18	12.25	0.053
Stable life	4	18	1.5	0.176
Water tank	4	18	8.25	0.101
Expensive shops	4	18	11	0.064
Not lack (anything)	3	14	10.667	0.033
Generator	3	14	11	0.062
Computer	3	14	11.667	0.047

Table B-1 continued.

	Number of Listings	Average percent	Average rank	Smith's S
College degree	3	14	4.333	0.098
Water pump	3	14	6.333	0.077
Driver's license	3	14	6.667	0.083
Washing machine	3	14	8.667	0.036
Limit # of children	3	14	7.667	0.067
Enough food	3	14	3.667	0.104
Western food	3	14	11	0.038
Bedroom furniture	2	9	8	0.051
Clothes for the children	2	9	6.5	0.063
School supplies for the children	2	9	6.5	0.057
Serve good liquor	2	9	12.5	0.023
Conspicuous consumption	2	9	7	0.055
Contact with other people	2	9	8.5	0.04
Have friends over	2	9	9.5	0.043
Bicycle	2	9	10.0	0.037
Bathtub	1	5	12	0.018
Wood floors	1	5	3	0.04
Aquarium	1	5	7	0.027
Home office and library	1	5	8	0.024
Education	1	5	5	0.027
Yard	1	5	16	0.008
Three bedrooms	1	5	1	0.045
Enough towels	1	5	9	0.025
Toothbrush and toothpaste	1	5	10	0.023
Bath soap	1	5	11	0.02
Yacht	1	5	12	0.012
Toilet	1	5	13	0.015
Sink	1	5	14	0.013
Ornaments on the veranda	1	5	15	0.01
Sofa	1	5	1	0.045
Shelving unit	1	5	2	0.042
Cruise around the world	1	5	13	0.009
Throw rugs	1	5	8	0.028
Technical training school	1	5	14	0.009
Simple but nice furniture	1	5	4	0.036
A medical center	1	5	16	0.003
Not rely on other people to solve my problems	1	5	8	0.006
Microwave	1	5	10	0.008
Children	1	5	3	0.036

Table B-1 continued.

	Number of Listings	Average percent	Average rank	Smith's S
Hair dryer	1	5	9	0.009
Floor waxer	1	5	10	0.005
Garage	1	5	14	0.006
Landscaping	1	5	15	0.003
Go to the beach	1	5	6	0.031
Wife	1	5	2	0.042
Research center (market and public opinion)	1	5	15	0.006
Internet	1	5	9	0.023
Contact with the outside world	1	5	11	0.017
A good future for the children	1	5	8	0.021
Motorcycle	1	5	11	0.01
No debts	1	5	10	0.008
Curtains	1	5	2	0.043
<i>Assimilado</i> lifestyle	1	5	11	0.008
Dining room set	1	5	4	0.038
Sheets	1	5	6	0.033
Wardrobe	1	5	7	0.03
Go out dancing	1	5	5	0.035
Video games	1	5	15	0.01
Visit family on holidays	1	5	18	0.003
No problems or worries	1	5	3	0.041
Fax machine	1	5	9	0.021
Matching set of chairs	1	5	7	0.032
Game room	1	5	9	0.028
Recreation opportunities	1	5	14	0.017
Go out to bars	1	5	16	0.013

APPENDIX C
QUESTIONNAIRE IN ENGLISH

QUESTIONNAIRE

1. Interview code (ID): _____ Date _____
2. Interviewer _____

Section A) Demographic Questions

3. Age _____
4. Sex: ☐ Female ☐ Male
5. Marital Status (read)
☐ Single (1)
☐ Married (2)
☐ Common-law (3)
☐ Divorced/Separated (4)
☐ Widow (5)
6. Do you work? ☐ Yes (1) ☐ No (0) ☐ Retired (2)
- 6a. What is your profession? _____
7. What's the highest grade in school you have completed? _____ Grade _____ Class
- 7a. When did you finish (year)? _____
8. Do you have children? ☐ Yes (1) ☐ No (0)
- 8a. If yes, how many? _____
9. How many adults live here at home? _____
- 9a. How many adults? _____
10. Are there children here who go to school? ☐ Yes ☐ No
- 10a. Where do they study? _____
11. Where were you born? _____
12. How long have you lived in Ponta Gea? _____

13. In what language did you learn to talk? _____

14. Do you smoke? ___ Yes (1) ___ No (0)

Section B) Lifestyle

1. Your house is ___ rented (1), ___ owned (2), ___ given (3), ___ work (4),
___ other(specify) _____

2. Do you have running water in your house? ___ Yes (1) ___ No (0)

3. Do you have a water tank? ___ Yes (1) ___ No (0)

4. Do you have electricity at home? ___ Yes (1) ___ No (0)

5. Do you have a phone at home? ___ Yes (1) ___ No (0)

6. Do you have a cellular phone? ___ Yes (1) ___ No (0)

7. Where did you spend your last vacation (time off)?

8. Do you have a driver's license? ___ Yes (1) ___ No (0)

9. Do you own a car? ___ Yes (1) ___ No (0)

10. What language do you speak most often here at home? _____

11. Do you speak English? ___ Yes (1) ___ A little (2) ___ No (3)

12. When someone is sick do you usually go to a ___ private, ___ public, ___ both types
of hospital?

13. Do you have workers here at home? ___ Yes (1) ___ No (0)

14. Do you have a television? ___ Yes (1) ___ No (0)

14a. What TV program do you like most? _____

15. Do you have video player? ___ Yes (1) ___ No (0)

16. Do you have satellite TV? ___ Yes (1) ___ No (0)

17. Do you have a sound system? ___ Yes (1) ___ No (0)

18. Do you have a fridge? ___ Yes (1) ___ No (0)

19. Do you have a freezer? ☐ Yes (1) ☐ No (0)
20. Do you have a stove with 4 burners (oven)? ☐ Yes (1) ☐ No (0)
21. Do you have air conditioning? ☐ Yes (1) ☐ No (0)
22. Do you go out to eat in restaurants? ☐ Yes (1) ☐ No (0)
- 22a. If yes, how many times per months? _____
23. Approximately, what is your monthly household income? _____, ☐ Don't know

Section C) Social Support

1. What is your religion?
- ☐ Catholic (1)
- ☐ Protestant (2) _____
- ☐ Muslim (3)
- ☐ Don't have (4)
- ☐ Don't know (5)
- ☐ Other _____
- 1a. Do you regularly go to Mosque on Fridays? (for muslims) ☐ Yes (1) ☐ No (0)
- 1b. How many times per week do you go to church? (for christians) _____ times per week
- 1c. Are you part of a small group at your church or mosque? ☐ Yes (1) ☐ No (0)
2. Do you have godparents here in Beira ☐ Yes (1) ☐ No (0)
3. Who from your family lives in Beira?
- _____
- _____
- _____
4. Are you on good terms with your neighbors? ☐ Yes (1) ☐ No (0)
5. Do you have a close friend, with whom you can discuss personal things? ☐ Yes (1) ☐ No (0)

I have a list here of people who can help you out when you need it: Family, Friends, Godparents, Boss, Co-workers/schoolmates, Neighbors, People from your home region, Church members, Other.

I am going to read five scenarios and I want you to tell me who you turn to in each case, using the categories on this card.

6. When you need to borrow money, where do you turn first? _____, and then _____, _____, _____.
7. When a family member is sick where do you go first for help? _____, _____, _____, _____.
8. When you have (had) problems with your spouse? _____, _____, _____, _____.
9. If you have (had) problems at work or school? _____, _____, _____, _____.
10. When someone in the family dies where do you look for help (material/emotional)? _____, _____, _____, _____.

Section D) Self Assessment of Stress (Cohen)

For the next set of questions, tell me how often you have felt this way in the last month:
[responses: 1=never; 2=sometimes; 3=almost all the time]

In the last month, how often have:

1. You felt that you were really realizing your goals?
1 _____ 2 _____ 3 _____
2. You felt that you could solve the problems in your life?
1 _____ 2 _____ 3 _____
3. You felt upset or stressed (worn out, irritated)?
1 _____ 2 _____ 3 _____
4. You felt angry or frustrated because things happened you could not control?
1 _____ 2 _____ 3 _____

Section E.) Life events

Please tell me if during the last 12 months (since June/July 2000), the following things happened:

1. ___ Yes ___ No Moved to a new house.
2. ___ Yes ___ No Someone in your family died (who?) _____
3. ___ Yes ___ No You were seriously ill or had an accident (in hospital).
4. ___ Yes ___ No Lost your job.
5. ___ Yes ___ No Got a new job.
6. ___ Yes ___ No Had a baby, were pregnant (new baby in home)
7. ___ Yes ___ No Finished a course. Type _____
8. ___ Yes ___ No Got married.
9. ___ Yes ___ No Got divorced or separated.
10. ___ Yes ___ No Spent time in prison.
11. ___ Yes ___ No Retired.

12. ☐ Yes ☐ No A close friend died.
 13. ☐ Yes ☐ No Got back together with your partner.
 14. ☐ Yes ☐ No A change in the intensity of conflicts with partner.
 15. ☐ Yes ☐ No Your spouse got a new job or lost a job.

Section F.) Hypertension

Finally, I'd like to ask you some questions about hypertension in your family and in general.

1. Have you ever been told you have hypertension? ☐ Yes (1) ☐ No (0)
 1a. If Yes, who told you? _____ When (year)? _____
 1b. Did you take any medicines for hypertension? ☐ Yes (1) ☐ No (0)
 1c. What was the medicine? _____
 1d. How long did you take it? _____
 1e. Did you have any symptoms or manifestations?

 2. Does someone in your family have hypertension? ☐ Yes (1) ☐ No (0) ☐ Don't know (2)
 2a. If Yes, who? _____ and what symptoms do they (did they) have?

 3. Do you know people who have tensão alta? ☐ Many (2) ☐ Some (1) ☐ None (0)

Section G) Anthropometry

Weight: _____ kg
 Height: _____ cm
 BP1: _____ / _____ mmHg
 BP2: _____ / _____ mmHg
 BP3: _____ / _____ mmHg

APPENDIX D
QUESTIONNAIRE IN PORTUGUESE

QUESTIONÁRIO

3. Código da entrevista: _____ Data _____
4. Entrevistador _____

Secção A) Perguntas Demograficas

3. Idade _____
4. Sexo: ☐ Feminino ☐ Masculino
5. Estado Civil (leia)
☐ Solteiro (1)
☐ Casado (2)
☐ União Marital (3)
☐ Divorciado/Separado (4)
☐ Viuvo (5)
6. Você trabalha? ☐ Sim (1) ☐ Não (0) ☐ Reformado (2)
- 6a. Qual é a sua profissão? _____
7. Qual é o nível ou classe mais elevada concluído? _____ Nível _____ Classe
- 7a. Em que ano concluiu? _____
8. Tem Filhos? ☐ Sim (1) ☐ Não (0)
- 8a. Se é sim, quantos tem? _____
9. Quantos adultos vivem aqui em casa? _____
- 9a. Quantas crianças? _____
10. Há crianças aqui em casa que vão à escola? ☐ Sim ☐ Não
- 10a. Onde estudam? _____
11. Onde você nasceu? _____
12. A quantos anos vive neste bairro? _____

13. Em que lingua aprendeu a falar? _____

14. Fuma? ☐ Sim (1) ☐ Não (0)

Secção B) Estilo da Vida

1. A casa é ☐ alugada(1), ☐ própria(2), ☐ cedida(3), ☐ serviço(4),
☐ outra(especificar) _____

2. Tem agua canalizada dentro da casa? ☐ Sim (1) ☐ Não (0)

3. Tem tanque de agua? ☐ Sim (1) ☐ Não (0)

4. Tem energia em casa? ☐ Sim (1) ☐ Não (0)

5. Tem telefone fixo? ☐ Sim (1) ☐ Não (0)

6. Tem telefone celular? ☐ Sim (1) ☐ Não (0)

7. Onde passou as últimas ferias? _____

8. Tem carta de condução? ☐ Sim (1) ☐ Não (0)

9. Tem carro próprio? ☐ Sim (1) ☐ Não (0)

10. Qual é a lingua que falam com frequência aqui em casa? _____

11. Fala Ingles? ☐ Sim (1) ☐ Um pouco (2) ☐ Não (3)

12. Quando alguém estiver doente costuma ir no hospital ☐ privado, ☐ estatal, ☐ ou os dois?

13. Tem empregados aqui em casa? ☐ Sim (1) ☐ Não (0)

14. Tem televisor? ☐ Sim (1) ☐ Não (0)

14a. Qual é o programa preferido? _____

15. Tem video? ☐ Sim (1) ☐ Não (0)

16. Tem antena parabólica? ☐ Sim (1) ☐ Não (0)

17. Tem aparelho da musica? ☐ Sim (1) ☐ Não (0)

18. Tem geleira? ☐ Sim (1) ☐ Não (0)

19. Tem congelador? ___ Sim (1) ___ Não (0)
20. Tem fogão com 4 bocas? ___ Sim (1) ___ Não (0)
21. Tem aparelho de ar condicionado? ___ Sim (1) ___ Não (0)
22. Tem ido passar refeições no restaurante? ___ Sim (1) ___ Não (0)
- 22a. Se é sim, quantas vezes por mês? _____
23. Aproximadamente, qual é o rendimento mensal do agregado? _____, ___
Não Sabe

Secção C) A Vida Social

2. Qual é a sua religião?
- ___ Católica (1)
- ___ Protestante (2) _____
- ___ Muçulmano (3)
- ___ Não Tem (4)
- ___ Não Sabe (5)
- ___ Outra _____
- 1a. Vai regularmente nas sextas feiras na mesquita? (os muçulmanos) ___ Sim (1) ___
Não (0)
- 1b. Quantas vezes vai a igreja por semana? (os cristãos) _____ vezes por semana.
- 1c. Você faz parte de uma comunidade dentro da sua igreja ou mesquita? ___ Sim (1)
___ Não (0)
2. Tem padrinhos aqui na cidade ___ Sim (1) ___ Não (0)
3. Quem da sua família está viver na Beira? ___ -

4. Você tem boas relações com os seus vizinhos? ___ Sim (1) ___ Não (0)
5. Tem um amigo próximo com quem pode falar das coisas pessoais? ___ Sim (1) ___
Não (0)

Tenho uma lista das pessoas que podem ajudar quando alguém está precisando:
Famíliares, Amigos, Padrinhos, Patrão, Colegas, Vizinhos, Conterrâneos, Irmãos da
igreja, Outra.

Vou ler alguns casos e quero que vocês me disse a quem voce recorre neste caso, usando as categorias escritas na carta.

11. Quando necessita de dinheiro onde vai primeiro pedir? _____, e depois _____, _____, _____
12. Quando um membro da familia estiver doente onde é que pede ajuda primeiro? _____, _____, _____, _____, _____
13. Quando tiver problemas com seu(a) esposo(a) á quem recorre? _____, _____, _____, _____, _____
14. Se tiver problemas no serviço ou na escola a quem se dirige? _____, _____, _____, _____, _____
15. Em caso de falecimento de um membro da familia a quem vai pedir ajuda? _____, _____, _____, _____, _____

Secção D) Percepção de Stress (Cohen)

Para as questões abaixo, fale-me sobre quantas vezes você sentiu isso durante o mês passado.

[categorias de respostas: 1=nunca; 2=as vezes; 3=quase todos dias]

Durante o mês passado, com que frequência:

1. Você sentiu que estava realmente conseguindo os seus objectivos?
1 _____ 2 _____ 3 _____
2. Você foi capaz de resolver os problemas na sua vida?
1 _____ 2 _____ 3 _____
3. Você se sentiu nervoso ou estressado (cansado, irritado)?
1 _____ 2 _____ 3 _____
4. Você se sentiu zangado ou frustrado porque aconteceram coisas que você não podia controlar?
1 _____ 2 _____ 3 _____

Secção E.) Acontecimentos na vida

Pode me dizer se durante os 12 meses anterior (Junho/Julho 2000), aconteceu alguma coisa como:

1. ___ Sim ___ Não Mudou de casa.
2. ___ Sim ___ Não Morreu alguém da familia (quem?) _____
3. ___ Sim ___ Não Voce teve alguma doença grave ou um accident.
4. ___ Sim ___ Não Perdeu emprego.
5. ___ Sim ___ Não Conseguiu novo emprego.
6. ___ Sim ___ Não Deu parto, ficou grávida (tem novo filho)

7. ☐ Sim ☐ Não Recebeu diploma. De _____
8. ☐ Sim ☐ Não Casou-se.
9. ☐ Sim ☐ Não Divorciou-se ou separou-se.
10. ☐ Sim ☐ Não Passou tempo na prisão.
11. ☐ Sim ☐ Não Foi reformado.
12. ☐ Sim ☐ Não Morreu um amigo muito próximo.
13. ☐ Sim ☐ Não Reconciliação com a esposa/marido.
14. ☐ Sim ☐ Não Mudança da intensidade dos conflitos com a esposa.
15. ☐ Sim ☐ Não Sua esposa começou ou parou de trabalhar.

Seção F.) Hipertensão

Finalmente, gostaria de fazer algumas perguntas sobre hipertensão na sua família e em geral.

1. Você já foi informado por alguém que sofre de hipertensão? ☐ Sim (1) ☐ Não (0)
- 1a. Se é sim, quem informou? _____ Quando? _____
- 1b. Tomou algum medicamento para tratar a hipertensão? ☐ Sim (1) ☐ Não (0)
- 1c. Qual foi o medicamento? _____
- 1d. Tomou durante quanto tempo? _____
- 1e. Você tinha quais sintomas ou manifestações? _____

2. Alguém na sua família teve ou tem a hipertensão? ☐ Sim (1) ☐ Não (0) ☐ Não Sabe (2)

2a. Se é sim, quem? _____ e quais são ou quais eram as manifestações ou sintomas? _____

3. Conhece as pessoas que sofram de tensão alta? ☐ Muitas (2) ☐ Algumas (1) ☐ Nenhuma (0)

Seção G) Antropometria

Peso: _____ kg

Altura: _____ cm

TA1: _____ / _____ mmHg

TA2: _____ / _____ mmHg

TA3: _____ / _____ mmHg

APPENDIX E

ORAL CONSENT – INSTITUTIONAL REVIEW BOARD

Inracultural Variation in Blood Pressure in Central Mozambique. Oral Consent/English.

My name is Nanette Barkey and I am a student at the University of Florida working under the supervision of H. Russell Bernard, Ph.D. I am doing a study in the Ponta Gea neighborhood on high blood pressure and the social factors that contribute to it. I would like to talk to you about your life, how you live, what is happening in your life, and some of your concerns. At the end of the interview we would like to measure your blood pressure, height and weight. All of this should take between 20 to 30 minutes. There are no anticipated risks or direct benefits associated with participating in this study. If you are found to have high blood pressure, I will give you a referral to a local hospital where you can receive treatment.

All of your answers are confidential to the extent provided by law and we will not be asking you for your name. Everything you tell us today will be kept private, we will not share any of this information with anyone outside of the research group. If you do not want to answer a question or you want to stop the interview at any time, that is fine. If you have any questions, you may contact me at _____ or my supervisor, Dr. Bernard, at Box 117305 Gainesville, FL 32611 USA. Questions about your rights as a research participant can be directed to the UFIRB or Box 112250 Gainesville, FL 32611 USA Do you have time to do the interview today?

Inracultural Variation in Blood Pressure in Central Mozambique. Oral Consent/Portuguese

Meu nome é dra. Nanette e sou uma aluna da Universidade da Florida. Estou aqui fazendo um estudo no bairro da Ponta-Gêa sobre hipertensão e os factores sociais que podem ser associados a ela. Gostaria de falar com você sobre a sua vida, como que você vive, alguns acontecimentos na sua vida, e suas preocupações. Depois da entrevista, gostaríamos de medir a sua altura, tensão arterial e o seu peso. Tudo isso levará mais ou menos 20 a 30 minutos.

Todos os dados são confidenciais e não vamos pedir o seu nome. A nossa conversa hoje é privada e não vamos dizer o que você nos disse a ninguém. Se você não quiser responder a uma pergunta ou quiser interromper a entrevista a qualquer momento, não há nenhum problema. Você tem tempo para falar conosco hoje?

APPROVED BY
University of Florida
Institutional Review Board (IRB 02)
Protocol# 2001-577
For Use Through _____

APPENDIX F CODE SHEET FOR SURVEY DATA

Section A (Demographics)

Age = years

Agegroup

3=30-39

4=40-49

5=50-59

6=60+

Sex 1=male, 2=female

(re-coded to 0=men,, 1=women)

Marital Status

1=single

2=married

3=commonlaw

4=divorced/separated

5=widowed

Children

Enter the number living

Currently Working

0=no

1=yes

2=retired

Profession (in English)

Education

Use census categories

Eduyear = last year in school

Adulthouse # => age 18 who live there

Childrenhouse # < age 18 who live there

Birth = where the person was born

1=BEIRA

2=Sofala (outside Beira)

3=Manica

4=Tete

5=Inhambane

6=Gaza

7=Maputo

8=Nampula

9=Zambezia

10=Cabo Delgado

11= Niassa

12= outside Mozambique

YearsPG = years lived in bairro

Maternal Language

1=Portuguese

2=Indian languages

3=Cindau

4=Cisena

5=Nyungwe

6=Shangane

7=Rhonga

8= Xitswa

9=Chuabo

10=Nyao

11=Macua

12=Bitonga

13=Makonde

14=Chope

15=Lomwe

16=Kiswahili

17-Shona

18=English
 19=Karungo
 20=Nyanga
 21=Zulu
 22=Maito
 23=Nyawinga
 24=Cichewa

Smoke

0=No
 1=Yes

Section B (lifestyle)

Housing

1=renting
 2=own
 3=given
 4=work
 5=other

Running Water

0=No
 1=Yes

Water Tank

0=no
 1=yes

Electricity

0=no
 1=yes

Telephone

0=no
 1=yes

Cellphone

0=no
 1=yes

Child in School

0=no
 1=yes

Type of school

0=public
 1=private
 2=church
 3=university level

Vacation

1=Beira
 2=outside Beira
 3=outside Moz.

Driver's License

0=no
 1=yes

Car

0=no
 1=yes

Home language

1=Portuguese
 2=other

Speak English

0=none
 1=a little
 2=yes

Hospital

1=private
 2=state
 3=both

Maid

0=no
1=yes

TV

0=no
1=yes

TVProgram

1=sports
2=news/telejornal
3=novelas
4=debates
5=other

Video

0=no
1=yes

Satellite

0=no
1=yes

STEREO

0=no
1=yes

FRIDGE

0=no
1=yes

FREEZER

0=no
1=yes

Oven

0=no
1=yes

AC

0=no
1=yes

Eat out

0=no
1=yes

Income = value in meticals**Incomegroup**

0=don't know
1 = <1 million
2 = 1 to <1.5 million
3 = 1.5 to <3 million
4 = 3 to <6 million
5 = 6 to <10 million
6 = >10 million

Section C (social support)**Religion**

1=catholic
2=protestant (not catholic)
3=muslim
4=none
5=don't know

Mosque on Fridays

0=no
1=yes

Frequency at Church

of times per week

Community

0=NO
1=yes

Padrinhos

- 0=no
1=yes

FamilyBeira

- 0=none
1=almost none/few
2=some
3=almost all/all

Neighbor

- 0=no
1=yes

Close Friend

- 0=no
1=yes

Scenarios

- 0= no one
1=family
2=neighbors
3=friends
4=job/patrao
5=bank
6=colleagues
7=igreja/mesquita
8=conterraneos
9=padrinhos
10 =state agency (OMM, tribunal)
0-5 scores for how well each person
could access social support for each
scenario.

Section D (Cohen scale)**Objectives**

- 1= never
2=sometimes
3=all the time

Problems

- 1= never
2=sometimes
3=all the time

Stressed

- 1= never
2=sometimes
3=all the time

Frustrated

- 1= never
2=sometimes
3=all the time

Cohen:notmeet + notsoLv + stress + frust

Section E (Life Events in last year)**Moved**

- 0=no
1=yes

Deathfam

- 0=no
1=yes

Whodied (in english)

BEENSICK

- 0=no
1=yes
lostjob
0=no
1=yes
newjob
0=no
1=yes
newbaby
0=no
1=yes
diploma
0=no

1=yes

marry

0=NO

1=yes

DIVSEPAR

0=no

1=yes

prison

0=no

1=yes

retire

0=no

1=yes

friendie

0=no

1=yes

reconcil

0=no

1=yes

famconfl

0=no

1=yes

spousejob

0=no

1=yes

Section F (BP history/measurements)haveHBP

0=no

1=yes

whotold

1=doctor

2=hospital

3=nurse

4=tech

5=other

whentold - year toldtakemeds

0=NO

1=yes

medtime

HOW LONG TOOK MEDS

typemeds**Otherel**

Second-degree relative has HBP

FamilyHBP

0=no

1=yes

whofamrelationship of the person who has HBP
to the respondentcloserel

first degree family member had HBP

OtherHBP

0=none

1=some

2=a lot

weight (kg)

height (cm)

syst1

dias1

syst2

dias2

syst3

DIAS3

Variables created

Hidias1=1 if dias1 => 90

HIDIAS2=1 IF DIAS2 => 90

Hidias3=1 if dias3 => 90

Hidias = 1 if hidias1, 2, or 3=1

Meandias = avg of three diatolicsHidimean =1 if meandias=>90

Hisyst1=1 if syst1=>140

Hisyst2=1 if syst2=>140

Hisyst3=1 if syst3=>140

Hisyst=1 if hisyst1,2, or 3=1

Meansyst = avg of three systolics

Hisymean=1 if meansyst=>140

HiBPmean=1 if Hidimean or

Hisymean=1

HBPmean=1 if Hidimean and

Hisymean=1

Dollars = income divided by 20,000

Dollgrp= dollars divided into terciles

1=10-99 dollars

2=100-230 dollars

3 = 231-1750 dollars

ownhome= person owns the house

0=NO

1=yes

owns= household owns the following

(15 items) running water, tank, electricity, car, phone, cellphone, home, tv, video, satellite, stereo, fridge, freezer, stove, and ac.

school = private school (1) or not (0).

Dohave = score (0-8) of following behaviors: speak Port at home, speak some English, children to private school, private doc, eat out, go away for vacations, maid, driver's license.

Porthome = speak Port at home

Speakeng = speak some English

Privdr = access to private doc

Goaway = leave Beira on vacations

Lifesty = score (1-23) of lifestyle items (dohave + owns)

Lifestygp = terciles of lifesty

1=0-7

2=8-13

3=14-23

langgp

If maternal language is Portuguese=1

If maternal language is sena/ndau=2

If maternal language is other = 3

Nuclear family = 1 if nuclear family member died in the last year (spouse, child, parent, sibling), otherwise =0.

hhold = total # of people living in hhold

black = black (1) or not

(Indian/White=0)

tvowner: preferred TV show (tv owners)

Inchhold = income in dollars divided by number of people in the household. Dollars/hhold.

Muslim = 1= muslim on religion, otherwise =0.

Socsuppl=belong to a

community + padrinhos in town +

family in Beira + neighbor + have a

good friend.

APPENDIX G TABLE OF EDUCATIONAL CATEGORIES FROM THE MOZAMBICAN CENSUS

Pergunta P19. Que nível de ensino frequentou ou o nível elevado que frequentou (se não foi concluído)?

Recenseamento 1997	Sistema Nacional de Educação (SNE)	Antigo Sistema
1 - Alfabetização	Alfabetização (1 ^a a 2 ^a ano)	
2 - Ensino primário 1 ^o Grau	Ensino Primário 1 ^o Grau (1 ^a /5 ^a classe)	Pré-4 ^a classe
3 - Ensino primário 2 ^o Grau	Ensino Primário 2 ^o Grau (6 ^a /7 ^a classe)	Ciclo Preparatório 1 ^a - 2 ^a ano
4 - Ensino Secundário Geral - 1 ^o Ciclo	Ensino Secundário Geral (8 ^a /10 ^a classe)	Livro - 2 ^a ciclo 3 ^a - 5 ^a ano
5 - Ensino Secundário Geral - 2 ^o Ciclo	Ensino Pós-Universitário (11 ^a /12 ^a classe)	Livro - 3 ^a ciclo 6 ^a - 7 ^a ano (inclui Seminário)
6 - Ensino Técnico Elementar	Ensino Técnico Elementar	Ensino Técnico Elementar
7 - Ensino Técnico Básico	Ensino Técnico Básico	Secção Preparatória
8 - Ensino Técnico Médio	Ensino Técnico Médio	Instituto
9 - Curso de Formação de Professor	Curso de Formação de Professor	Curso de Formação de Professor
10 - Superior	Superior	Superior

REFERENCES

- AIM – Mozambique News Agency. 2001. President Closes FRELIMO Cadre Congress. <http://www.poptel.org.uk/mozambique-news/newsletter/aim215.html>. September 20.
- AIM – Mozambique News Agency. 2002. Central Committee Opts for Guebuza. <http://www.poptel.org.uk/mozambique-news/newsletter/guebuza.html>. June 8.
- Alden C. 2001. Mozambique and the Construction of the New African State. Palgrave and St. Martin's Press, New York.
- Alexander D. 1971. Holiday in Mozambique: A Guide to the Territory. Purnell, Rustica Press, Cape Town.
- AllAfrica.com. 2002. Outspoken Provincial Governor Say Economic Success Isn't Helping the Poor. <http://allafrica.com/stories/200207180001.html>. July 18.
- Armelagos G. 1991. Human Evolution and the Evolution of Disease. *Ethnicity and Disease*. 1(1):21-25.
- Astagneau P, Lang T, Delarocque T, Jeanne E, Salem G. 1992. Arterial Hypertension in Urban Africa: an epidemiological study on a representative sample of Dakar inhabitants. *Journal of Hypertension*. 10:1095-1101.
- Aunger R. 1999. Against Idealism / Contra Consensus. *Current Anthropology*. 40(suppl. February):S93-S101.
- Barth F. 1967. On Study of Social Change. *American Anthropologist*. 69(6):661-678.
- Batchelder WH, Romney KA. 1988. Test Theory without an Answer Key. *Psychometrika*. 53:71-92.
- Berkman LF. 1977. Psychosocial Factors, Host Resistance, and Mortality—9 and a ½ year Mortality Study of Adults in Alameda County California. *American Journal of Epidemiology*. 106(3):237-238.
- Berkman LF. 1983. Assessing the Physical Health Effects of Social Networks and Social Support. *Annual Review of Public Health*. 5:413-432.
- Bernard HR. 1995. Research Methods in Cultural Anthropology second edition. Alta Mira Press, Walnut Creek CA.

- Bernard HR. 2002. Research Methods in Cultural Anthropology third edition. Alta Mira Press, Walnut Creek CA.
- Bernard HR, Killworth PD, Sailer L, Kronenfeld D. 1984. The Problem of Informant Accuracy: The Validity of Retrospective Data. *Annual Review of Anthropology*. 13:495-17.
- Bieliauskas LA, Garron DC. 1982. Psychological Depression and Cancer. *General Hospital Psychiatry*. 4(3):187-95.
- Borgatti SP. 1992. ANTHROPAC 4.0. Columbia: Analytic Technologies.
- Boster JS. 1986. Exchange of Varieties and Information Between Aguaruna Manioc Cultivators. *American Anthropologist*. 88:429-36.
- Boster JS. 1987. Why Study Variation? *American Behavioral Scientist*. 31(2):150-162.
- Cappuccio FP, Plange-Rhule J, Phillips RO. 2000. Prevention of Hypertension and Stroke in Africa. *Lancet*. 356(9230): 677-8.
- Cassel J. 1976. The Contribution of the Social Environment to Host Resistance: the Fourth Wade Hampton Frost Lecture. *American Journal of Public Health*. 104:107-23.
- Cassel J, Tyroler H. 1961. Epidemiological Studies of Culture Change I. *Archives of Environmental Health*. 3:25-33.
- Cassel, JC, Patrick RS, Jenkins CD. 1960. Epidemiological Analysis of the Health Implications of Culture Changes. *Annals of the New York Academy of Science*. 84:938-49.
- Caulkins D. 1998. Consensus Analysis: Do Scottish Business Advisors Agree on Models of Success? In: Using Methods in the Field, V.C de Munck and E.J. Sobo eds. AltaMira Press: Walnut Creek CA. Pages 179-195.
- Caulkins D, Hyatt SB. 1999. Using Consensus Analysis to Measure Cultural Diversity in Organizations and Social Movements. *Field Methods* 11(1):5-26.
- Charleton KE, Wolmarans P, Marais AD, Lombard CJ. 1997a. Micronutrient Intake and Cardiovascular Risk Factors in Older Coloured South Africans. *East African Medical Journal*. 74(8):478-86.
- Charleton KE, Lambert EV, Kreft J. 1997b. Physical Activity, Change in Blood Pressure and Predictors of Mortality in Older South Africans – A 2-year Follow-up Study. *South African Medical Journal*. 87(9):1124-30.

- Chavez LF, Hubbell A, McMullin J, Martinez RG, Mishra S. 1995. Structure and Meaning in Models of Breast and Cervical Cancer Risk Factors: A Comparison of Perceptions among Latinas, Anglo Women, and Physicians. *Medical Anthropology Quarterly*. 9(1):40-74.
- Chavez LF, McMullin J, Mishra S, Hubbell FA. 2001. Beliefs Matter: Cultural Beliefs and the Use of Cervical Cancer-Screening Tests. *American Anthropologist*. 103(4):1114-1129.
- Cohen MN. 1989. Health and the Rise of Civilization. Yale University Press, New Haven.
- Cohen S, Kamarck T, Mermelstein R. 1983. A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*. 24:385-96.
- Cohen S, Manuck SB. 1995. Stress, Reactivity, and Disease. *Psychosomatic Medicine*. 57(5):423-6.
- Cooper F. 2001. What is the Concept of Globalization Good For? An African Historian's Perspective. *African Affairs*. 100:189-213.
- Cooper RS, Rotimi CN, Ataman S, McGee D, Osotimehin B, Kadiro S, Muna W, Kingue S, Fraser H, Forrester T, Bennett F, Wilks R. 1997. The Prevalence of Hypertension in Seven Populations of West African Origin. *American Journal of Public Health*. 87(2):160-8
- Coreil JC, Levin JS. 1985. A Critique of the Lifestyle Concept in Public Health Education. *International Quarterly of Community Health Education*. 5(2):103-114.
- CountryWatch.com report on Mozambique. September 15, 2002.
http://www.countrywatch.com/cw_country.asp?vCOUNTRY=120
- Cruickshank JK, Mbanya JC, Wilks R. 2001. Sick Genes, Sick Individuals or Sick Populations with Chronic Disease? The Emergence of Diabetes and High Blood Pressure in African-Origin Populations. *International Journal of Epidemiology*. 30(1):111-7.
- Curtain PD. 1992. The Slavery Hypothesis for Hypertension Among African Americans: The Historical Evidence. *American Journal of Public Health*. 82:1681-1686.
- D'Andrade RG. 1984. Cultural Meaning Systems. In: Culture Theory: Essays on Mind, Self and Emotion. R.A. Schweder and R.A. Levine, eds. Cambridge University Press, Cambridge England. Pages 88-119.
- D'Andrade RG. 1995. The Development of Cognitive Anthropology. Cambridge University Press, Cambridge.

- Dalgard OS, Haheim LL. 1998. Psychosocial Risk Factors and Mortality. *Journal of Epidemiology and Community Health*. 52(8):476-81.
- Damasceno AAM. 1999. Salt Sensitivity in Black Hypertensive Patients in Mozambique. Ph.D. Dissertation, Universidade Eduardo Mondlane, Maputo.
- Dawber TR, Kannel WB, Kagan A, Donabedian RR, McNamara PM, Pearson G. 1967. Environmental Factors in Hypertension. In: The Epidemiology of Hypertension. Stamler, Stamler, and Pullman, eds. Stratton, New York. Pages 255-88.
- de Villiers P, Geffen L. 1998. The Development of Passive Health Surveillance by a Sentinel Network of Family Practitioners in South Africa. *South African Medical Journal*. 88:256-9.
- Dimsdale JE. 2000. Stalked by the Past: The Influence of Ethnicity on Health. *Psychosomatic Medicine*. 62(2):161-70.
- Donnison CP. 1929. Blood Pressure in the African Native. *Lancet* 1:6.
- Dressler WW. 1985. The Social and Cultural Context of Coping: Action, Gender and Symptoms in a Southern Black Community. *Social Science & Medicine*. 21(5):499-506.
- Dressler WW. 1986. Unemployment and Depressive Symptoms in a Southern Black Community. *Journal of Nervous and Mental Disease*. 174(11):639-45.
- Dressler WW. 1987. The Stress Process in a Southern Black Community: Implications for Prevention Research. *Human Organization*. 46(3):211-20.
- Dressler WW. 1990. Lifestyle, Stress and Blood Pressure in a Southern Black Community. *Psychosomatic Medicine*. 52:182-98.
- Dressler WW. 1991. Stress and Adaptation in the Context of Culture. State University of New York Press, Albany NY.
- Dressler WW. 1995. Modeling Biocultural Interactions: Examples from Studies of Stress and Cardiovascular Disease. *Yearbook of Physical Anthropology*. 38:27-56.
- Dressler WW. 1996. Culture and Blood Pressure: Using Consensus Analysis to Create a Measurement. *Cultural Anthropology Methods*. 8(3):6-8.
- Dressler WW. 1999. Modernization, Stress, and Blood Pressure; New Directions in Research. *Human Biology*. 71(4):583-605
- Dressler WW. 2000a. Application to the National Science Foundation. Unpublished.

- Dressler WW. 2000b. The Health Consequences of Cultural Consonance. *American Anthropologist*. 102(2):244-60.
- Dressler WW, Badger LW. 1985. Epidemiology of Depressive Symptoms in Black Communities: A Comparative Analysis. *Journal of Nervous and Mental Disease*. 173(4):212-20.
- Dressler WW, Bindon JR. 2000. The Health Consequences of Cultural Consonance. *American Anthropologist*. 102(2):244-60.
- Dressler WW, Bindon JR, Neggars YH. 1998. Culture, Socioeconomic Status and Coronary Heart Disease Risk Factors in an African American Community. *Journal of Behavioral Medicine*. 21(6):527-44.
- Dressler WW, Campos Balieiro M, dos Santos JE. 1997. The Cultural Construction of Social Support in Brazil: Associations with Health Outcomes. *Culture, Medicine, and Psychiatry*. 21:303-35.
- Dressler WW, dos Santos JE. 2000. Social and Cultural Dimensions of Hypertension in Brazil. *Cadernos de Saúde Pública*. 16(2):303-15.
- Dressler WW, dos Santos JE, Viteri FE. 1986. Blood Pressure, Ethnicity, and Psychosocial Resources. *Psychosomatic Medicine*. 48(7):509-19.
- Dressler WW, dos Santos JE, Gallagher PN, Viteri FE. 1987. Arterial Blood Pressure and Modernization in Brazil. *American Anthropologist*. 89(2):398-409.
- Dressler WW, Grell GAC, Viteri FE. 1995. Intracultural Diversity and the Sociocultural Correlates of Blood Pressure. *Medical Anthropology Quarterly*. 9:291-313.
- Dressler WW, Grell GAC, Gallagher PN, Viteri FE. 1988. Blood Pressure and Social Class in a Jamaican Community. *American Journal of Public Health*. 78(6):714-6.
- Dressler WW, Mata A, Chavez A, Viteri FE. 1987. Arterial Blood Pressure and Individual Modernization in a Mexican Community. *Social Science and Medicine*. 24(8):679-87.
- Dressler WW, Mata A, Chavez A, Viteri FE, Gallagher P. 1986. Social Support and Arterial Blood Pressure in a Central Mexican Community. *Psychosomatic Medicine*. 48(5):338-50.
- Earthy D. 1933. Valenge Women: the social and economic life of the Valenge women of Portuguese East Africa: an ethnographic study. Oxford University Press, London.
- Edwards D. 1995. Life Events and Hypertension – A Negative Finding. *South African Medical Journal*. 85:1346-48.

- Edwards R, Unwin N, Mugusi F, Whiting D, Rashid S, Kissima J, Aspray TJ, Alberti KGMM. 2000. Hypertension Prevalence and Care in an Urban and Rural Area of Tanzania. *Journal of Hypertension*. 18:145-52.
- Empresa Moderna. 1951. Cidade da Beira—Projecto de Urbanização Memória Justificativa. Beira, Mozambique.
- Famodu AA, Osilesi O, Makinde YO, Asonuga OA. 1998. Blood Pressure and Blood Lipid Levels among Vegetarian, Semi-Vegetarian, and Non-Vegetarian Native Africans. *Clinical Biochemistry*. 31(7):545-9.
- Feachem RG. 1992. The Health of Adults in the Developing World. World Bank, Washington D.C.
- Forrest KYZ, Bunker CH, Kriska AM, Ukoli FAM, Huston SL, Markovic N. 2001. Physical Activity and Cardiovascular Risk Factors in a Developing Population. *Medicine and Science in Sports and Exercise*. 33(9):1598-1604.
- Forrester T, Cooper RS, Weatherall D. 1998. Emergence of Western Diseases in the Tropical World: The Experience with Chronic Cardiovascular Diseases. *British Medical Bulletin*. 54(2):463-73.
- Garcia-Javier AG, de Munck V, Rocha ALS, Vargas GLA, Garro T. 1998. Consensus Analysis: High Blood Pressure in a Mexican Barrio. In: Using Methods in the Field, Munck and Sobo eds. AltaMira Press, Walnut Creek CA. Pages 197-209.
- Garro LC. 1986. Intracultural Variation in Folk Medical Knowledge: A Comparison between Curers and Noncurers. *American Anthropologist*. 88(2):351-70.
- Garro LC. 1987. Explaining High Blood Pressure: Variation in Knowledge about Illness. *American Ethnologist*. 15:(1)98-119.
- Giles WH, Pacque M, Greene BM, Taylor HR, Munoz B, Cutler M, Douglas J. 1994. Prevalence of Hypertension in Rural West Africa. *American Journal of Medical Science*. 308(5):271-5.
- Gleiberman L. 2001. Salt, Hypertension, Evolution. *Psychosomatic Medicine*. 63(2): 325-7.
- Guarnaccia PJ. 1993. Ataques de nervios in Puerto Rico: Culture-Bound Syndrome or Popular Illness? *Medical Anthropology*. 15(2):157-70.
- Handwerker WP. 1998. Consensus Analysis: Sampling Frames for Valid, Generalizable Research Findings. In: Using Methods in the Field, V.C. de Munck and E.J. Sobo eds. AltaMira Press, Walnut Creek CA. Pages 165-178.

- Handwerker WP. 2002. The Construct Validity of Cultures: Culture Theory, Cultural Diversity and a Method for Ethnography. *American Anthropologist*. 104(1):106-122.
- Handwerker WP, Borgatti SP. 1998. Reasoning with Numbers. In: Handbook of Methods in Cultural Anthropology, H.R. Bernard editor. AltaMira Press, Walnut Creek CA. Pages 549-593.
- Hanlon J. 1996. Peace Without Profit: How the IMF Blocks Rebuilding in Mozambique. Heinemann, Portsmouth NH.
- Harris M. 1958. Portugal's African "Wards." Africa Today Pamphlets, The American Committee on Africa, New York.
- Harris M. 1966. Race, Conflict, and Reform in Mozambique. In: The Transformation of East Africa, Fred Burke ed. New York, Basic Books. Pages 157-184.
- Hawkins NG, Davies R, Holmes TH. 1957. Evidence of Psychosocial Factors in the Development of Pulmonary Tuberculosis. *American Review of Tuberculosis and Pulmonary Diseases*. 75(5):768-780.
- Henry JP, Cassel J. 1969. Psychosocial Factors in Essential Hypertension. *American Journal of Epidemiology*. 90:171-200.
- Hiernaux J, Schweich A. 1979. Variation of Blood Pressure and Heart Rate in and between Eighteen Ethnic Groups of Rwanda, Burundi and Zaire. *Journal of Human Evolution*. 8:761-71.
- Holmes TH, Rahe RH. 1967. The Social Readjustment Scale. *Journal of Psychosomatic Medicine*. 11:213-18.
- Honwana AM. 1997. Sealing the Past, Facing the Future: Trauma Healing in Rural Mozambique. Accord, www.c-r.org/acc_moz/honwana.htm (September 13, 1999).
- Howard A, Scott RA. 1965. A Proposed Framework for the Analysis of Stress in the Human Organism. *Behavioral Science*. 10(2):141-160.
- Hunter JM, Sparks BT, Mufunda J, Musabayane CT, Sparks HT, Mahomed K. 2000. Economic Development and Women's Blood Pressure: Field Evidence from Rural Mashonaland, Zimbabwe. *Social Science and Medicine*. 50:773-95.
- Hurwicz ML. 1995. Physicians' Norms and Health Care Decisions of Elderly Medicare Recipients. *Medical Anthropology Quarterly*. 9(2):211-235.
- Inda JX, Rosaldo R. 2002. The Anthropology of Globalization: A Reader. Blackwell Publishers, Malden MA.

- Inkeles A, Smith DH. 1974. Becoming Modern: Individual Change in Six Developing Countries. Harvard University Press, Cambridge MA.
- Instituto Nacional de Estatística. 1999. II Recenseamento Geral da População e Habitação 1997. Resultados Definitivos, Província de Sofala. Maputo, Bureau de Informação Pública.
- James GD, Brown DE. 1997. The Biological Stress Response and LifeStyle: Catecholamines and Blood Pressure. *Annual Review of Anthropology*. 26:313-35.
- James SA. 1994. John Henryism and the Health of African Americans. *Culture, Medicine and Psychiatry*. 18:163-82.
- James SA. 1996. The John Henryism Scale for Active Coping. In: Handbook of Tests and Measurements for Black Populations, volume 2, R.L. Jones editor. Cobb and Henry, Hampton VA. Pages 415-425.
- James, SA, Thomas PE. 2000. John Henryism and Blood Pressure in Black Populations: A Review of the Evidence. *African American Research Perspectives*. 6:1-10.
- Johnson JC. 1990. Selecting Ethnographic Informants. Sage Publications, Thousand Oaks CA.
- Junod HA. 1912. The Life of a South African Tribe. Macmillan and Co., London.
- Kadiri S, Salako BL. 1997. Cardiovascular Risk Factors in Middle Aged Nigerians. *East African Medical Journal*. 74(5):303-6.
- Kalpan RM. 1990. Behavior as the Central Outcome in Health Care. *American Psychologist*. 45(11):1211-20.
- Kaminer B, Lutz WPW. 1960. Blood Pressure in Bushmen of the Kalahari. *Circulation*. 22:289.
- Kaufman JS. 2001. No More "Slavery Hypothesis" Yarns. *Psychosomatic Medicine*. 63(2):324.
- Kaufman JS, Barkey NL. 1993. Hypertension in Africa: An Overview of Prevalence Rates and Causal Risk Factors. *Ethnicity and Disease*. 3(Suppl):S83-101.
- Kaufman JS, Owoaje EE, Rotimi CN, Cooper RS. 1999. Blood Pressure Change in Africa: a case study from Nigeria. *Human Biology*. 71(4):641-57.
- Kaufman JS, Owoaje EE, James SA, Rotimi CN, Cooper RS. 1996. Determinants of Hypertension in West Africa: Contribution of Anthropometric and Dietary Factors to Urban-Rural and Socioeconomic Gradients. *American Journal of Epidemiology*. 143(12):1203-18.

- Kawachi I, Colditz GA, Ascherio A, Rimm EB, Giovannucci E, Stampfer MJ, Willett WC. 1996. A Prospective Study of Social Networks in Relation to Total Mortality and Cardiovascular Disease in Men in the USA. *Journal of Epidemiology and Community Health*. 50(3):245-51.
- Kennedy D, Barkey NL. n.d. Using Likert Scales in Low Literacy Populations. Manuscript in preparation.
- Kempton W, Boster JS, Hartley JA. 1995. Environmental Values in American Culture. MIT Press, Cambridge MA.
- Kimberly Y, Forrest Z, Bunker CH, Kriska AM, Ukoli FAM, Huston SL, Markovic N. 2000. Physical Activity and Cardiovascular Risk Factors in a Developing Population. *Medicine & Science in Sports and Exercise*. 33(9):1598-1604.
- Kleinman A. 1980. Patients and Healers in the Context of Culture. University of California Press, Berkeley.
- Kruger HS, Venter CS, Vorster HH. 2001. Obesity in African Women in the North West Province, South Africa is Associated with an Increased Risk of Non-Communicable Diseases: the THUSA study. (Transition and Health during Urbanisation of South Africans.) *The British Journal of Nutrition*. 86(6): 733-40
- Lenfant C. 2001. Can we Prevent Cardiovascular Diseases in Low- and Middle-Income Countries? *Bulletin of the World Health Organization*. 79(10):980-7.
- Lewis DE. 1990. Stress, Migration, and Blood Pressure in Kiribati. *American Journal of Human Biology*. 2:139-151.
- Lore W. 1993. Epidemiology of Cardiovascular Diseases in Africa with Special Reference to Kenya: An Overview. *East African Medical Journal*. 70(6):357-61.
- Luke AH, Rotimi CN, Cooper RS, Long AE, Forrester TE, Wilks R, Bennett FL, Ogunbiyi O, Compton JA, Bowsher RR. 1998. Leptin and Body Composition of Nigerians, Jamaicans, and US blacks. *American Journal of Clinical Nutrition*. 67(3):391-6.
- Magondone M. Unpublished manuscript. Estudo da Cidade da Beira. Universidade Catolica de Mozambique, Beira.
- Maher D, Hoffman I. 1995. Prevalence of Genital Infections in Medical Inpatients in Blantyre, Malawi. *Journal of Infection*. 31:77-8.
- Marlin R. 2001. Possessing the Past: Legacies of Violence and Reproductive Illness in Central Mozambique. Ph.D. dissertation, Rutgers University.
- Marrato J. 1996. The Impact of War Trauma on Women in Mozambique: Mechanisms and Coping Strategies. M.Sc. Dissertation, University College London.

- Martin PR, Theunissen C. 1993. The Role of Life Event Stress, Coping, and Social Support in Chronic Headaches. *Headache*. 33(6):301-306.
- Mason JW. 1971. A Re-evaluation of the Concept of Non-Specificity in Stress Theory. *Journal of Psychiatric Research*. 8:323-333.
- Mbanya JCN, Minkoulou EM, Salah JN, Balkau B. 1998. The Prevalence of Hypertension in Rural and Urban Cameroon. *International Journal of Epidemiology*. 27:181-5.
- Mbaya VB. 1998. Hypertension in East Africans and Others of African Descent. *East African Medical Journal*. 75(5):300-3.
- McLean DE, Hartfield-Timajchy K, Wingo PA, Floyd RL. 1993. Psychosocial Measurement: Implications for the Study of Preterm Delivery in Black Women. *Preventive Medicine*. 6(supplement):39-81.
- Mechanic D. 1962. Students Under Stress. Free Press, Glencoe IL.
- Mechanic D. 1978. Effects of Psychological Distress on Perceptions of Physical Health and Use of Medical and Psychiatric Facilities. *Journal of Human Stress*. 4:26-33.
- Miller MA, Rahe RH. 1997. Life Changes Scaling for the 1990's. *Journal of Psychosomatic Research*. 43(3):279-92.
- Ministry of Health, Government of Mozambique. 2001. Relatorio do Encontro Nacional para Divulgacao dos Dados das Taxas de Prevalencia do HIV/SIDA em Mocambique. Maputo, National Health Office.
- Mollentze WF, Moore AJ, Steyn AF, Joubert J, Steyn K, Moosthuizen G, Weich DJV. 1995. Coronary Heart Disease Risk Factors in a Rural and Urban Orange Free State Black Population. *South African Medical Journal*. 85:90-6.
- Mudaiyi TK, Onyanga-Omara A, Gelman AL. 1997. Trends in Morbidity in General Medicine at United Bulawayo Hospitals, Bulawayo Zimbabwe. *Central African Journal of Medicine*. 43(8):213-19.
- Mufunda J, Sparks B, Chifamba J, Dakwa C, Matenga JA, Adams JM, Sparks HM. 1996. Comparison of the Omron HEM-713C Automated Blood Pressure Monitor with a Standard Auscultatory Method Using a Mercury Manometer. *Central African Medical Journal*. 4:230-2.
- Mugambi M., Little MA. Blood Pressure in Nomadic Turkana Pastoralists. 1983. *East African Medical Journal*. 60(12):863-9.
- Muianga E. 1996. Mulheres e Guerra. Unpublished Licenciatura Thesis, Eduardo Mondlane University, Maputo, Mozambique.

- Muna WFT, Ndobu P, Ouankou MD, Kingue S, Nouedoui C. 1996. Particularites Biologiques de l'Hypertension Arterielle Non-Complicquée en Afrique Sub-Saharienne. *Medicine Tropical*. 56:15S-13S.
- Nelson HD. 1984. Mozambique, A Country Study. U.S. Government Printing Office, Washington D.C.
- Newitt M. 1995. A History of Mozambique. Indiana University Press, Bloomington.
- Nordstrom C. 1997. A Different Kind of War Story. University of Pennsylvania Press, Philadelphia.
- Ogunlesi A, Osotimehin B, Abbiyessuku F, Kadiri S, Akingkuba O, Liao C, Cooper RS. 1991. Blood Pressure and Educational Level among Factory Workers in Ibadan, Nigeria. *Journal of Human Hypertension*. 5(5):375-80.
- Oths KS. 1991. Psychosocial and Physical Stressors in Low Birth Weight. Grant Proposal to the National Institutes of Health (funded 1992-1997).
- Packard R. 1989. White Plague, Black Labor. University of California Press, Berkeley.
- Pelto PJ, Pelto GH. 1975. Intra-Cultural Diversity: Some Theoretical Issues. *American Ethnologist*. 2:1-18.
- Pfeiffer J. 2002. African Independent Churches in Mozambique: Healing the Afflictions of Inequality. *Medical Anthropology Quarterly*. 16(2):176-199.
- Poulter NR, Khaw KT, Hopwood BEC, Mugambi M, Peart WS. 1984. Blood Pressure and Its Correlates in an African Tribe in Urban and Rural Environments. *Journal of Epidemiology and Community Health*. 38:181-86.
- Poulter N, Khaw KT, Mugambi M, Peart WS, Sever PS. 1985. Migration-induced Changes in Blood Pressure: A Controlled Longitudinal Study. *Clinical Experiments in Pharmacology and Physiology*. 12:211-216.
- Poulter NR, Khaw KT, Sever PS. 1988. Higher Blood Pressures of Urban Migrants from an African Low-Blood Pressure Population are not Due to Selective Migration. *American Journal of Hypertension*. 1:143S-145S.
- Razum O. 1996. Monitoring Cardiovascular Disease in Zimbabwe; A Review of Needs and Options. *Central African Journal of Medicine*. 42(4):120-4.
- Romney AK. 1989. Quantitative Models, Science and Cumulative Knowledge. *Journal of Quantitative Anthropology*. 1:153-223.
- Romney AK. 1994. Cultural Knowledge and Cognitive Structure. In: The Making of Psychological Anthropology, Vol. II, M. Suarez-Orozco, G. Spindler and L. Spindler editors. Harcourt Brace, New York. Pages 254-283.

- Romney AK. 1999. Cultural Consensus as a Statistical Model. *Current Anthropology*. 40(suppl. February):S103-S115.
- Romney AK, Batchelder WH, Weller SC. 1987. Recent Applications of Cultural Consensus Theory. *American Behavioral Scientist*. 31(2):163-77.
- Romney AK, Boyd JP, Moore CC, Batchelder WH, Brazill TJ. 1996. Culture as Shared Cognitive Representations. *Proceedings of the National Academy of Sciences*. 93:4699-4705.
- Romney AK, D'Andrade R. 1964. Cognitive Aspects of English Kinship Terms in Transcultural Studies in Cognition. *American Anthropologist*. 26(2):146-170.
- Romney AK, Weller SC, Batchelder WH. 1986. Culture as Consensus: A Theory of Culture and Informant Accuracy. *American Anthropologist*. 88:313-38.
- Rosengren A, Orthgomer K, Wedel H, Wilhelmsen L. 1993. Stressful Life Events, Social Support, and Mortality in Men Born in 1933. *British Medical Journal*. 307(6912):1102-5.
- Salako LA. 1993. Hypertension in African and Effectiveness of its Management with Various Classes of Anti-hypertensive Drugs and in Different Socio-Economic and Cultural Environments. *Clinical and Experimental Hypertension*. 15(6):997-1004.
- Sapir E. 1938. Why Cultural Anthropology Needs a Psychiatrist. *Psychiatry*. 1:7-12.
- Schell LM. 1997. Culture as a Stressor: A Revised Model of Biocultural Interaction. *American Journal of Physical Anthropology*. 102:67-77.
- Schuetze C. n.d. The Resurgence of Curandeiras in the Gorongosa Region of Sofala Province, Mozambique. Unpublished Research
- Scotch NA. 1963a. Sociocultural Factors in the Epidemiology of Zulu Hypertension. *American Journal of Public Health*. 53:1205-13.
- Scotch NA. 1963b. Medical Anthropology. *Biennial Review of Anthropology*. 3:30-86.
- Scudder T, Colson E. 1982. From Welfare to Development: a Conceptual Framework for the Analysis of Dislocated People. In: Involuntary Migration and Resettlement, A. Hansen and A. Oliver-Smith editors. Westview Press, Boulder CO. Pages 267-287.
- Seedat YK. 1982. Biosocial Factors and Hypertension in Urban and Rural Zulus. *South African Medical Journal*. 61:999-1002
- Seedat YK. 1998. The Prevalence of Hypertension and the Status of Cardiovascular Health in South Africa. *Ethnicity and Disease*. 8:394-7.

- Seedat YK. 2000 Hypertension in Developing Nations in Sub-Saharan Africa. *Journal of Human Hypertension*. 14 (10-11):739-747.
- Selye Hans. 1956. The Stress of Life. McGraw-Hill, New York.
- Shaper AG. 1967. Blood Pressure Studies in East Africa. In: The Epidemiology of Hypertension. Stamler, Stamler and Pullman eds. Stratton, New York. Pages 139-149.
- Shaper AG, Wright DH, Kyobe J. 1969. Blood Pressure and Body Build in Three Nomadic Tribes of Northern Kenya. *East African Medical Journal*. 46(5):273-81.
- Shore B. 1996. Culture in Mind: Cognition, Culture, and the Problem of Meaning. Oxford University Press, Oxford.
- Simmons D, Barbour G, Congleton J, Levy J, Meacher P, Saul H, Sowerby T. 1986. Blood Pressure and Salt Intake in Malawi: An Urban-Rural Study. *Journal of Epidemiology and Community Health*. 40:188-92.
- Somova L, Connolly C, Diara K. 1995. Psychosocial Predictors of Hypertension in Black and White Africans. *Journal of Hypertension*. 13:193-99.
- SPSS. 2000. SPSS for Windows. Chicago IL.
- Steyn K, Gaziano TA, Bradshaw D, Laubscher R, Fourie J. 2001. Hypertension in South African Adults: Results from the Demographic and Health Survey, 1998. *Journal of Hypertension*. 19(10):1717-1725.
- Steyn K, Fourie J, Lombard C, Katzenellenbogen J, Bourne L, Joost P. 1996. Hypertension in the Black Community of the Cape Peninsula, South Africa. *East African Medical Journal*. 73(11):758-63.
- Toure IA, Salissou O, Chapko MK. 1992. Hospitalizations in Niger for Complications from Arterial Hypertension. *American Journal of Hypertension* 5:322-24.
- Truswell AS, Kennelly BM, Hansen JD, Lee RB. 1972. Blood Pressures of Kung Bushmen in Northern Botswana. *American Heart Journal*. 84(1):5-12.
- Ulijaszek S, Huss-Ashmore R. 1997. Human Adaptability Past Present and Future. Oxford University Press, Oxford.
- van Rooyen JM, Huisman HW, Eloff FC, Laubscher PJ, Malan L, Steyn HS, Malan NT. 2002. Cardiovascular Reactivity in Black South African Males of Different Age Groups: The Influence of Urbanization. *Ethnicity and Disease*. 12(1):69-75.
- Vorster HH. 2002. The Emergence of Cardiovascular Disease during Urbanisation of Africans. *Public Health Nutrition*. 5(1A):239-43.

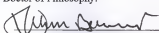
- Walker ARP, Sareli P. 1997. Coronary Heart Disease: Outlook for Africa. *Journal of the Royal Society of Medicine*. 90:23-7.
- Watts TEE, Siziya S. 1997. Education, Occupation and Health Status of People of Age Five Years or More Living in a High Density Urban Area in Zimbabwe. *Central African Journal of Medicine*. 43(9):260-64.
- Weisner TS, Abbott S. 1978. Women, Modernity and Stress: Three Contrasting Contexts for Change in East Africa. *Journal of Anthropological Research*. 421-451.
- Weller SC. 1983. New Data on Intracultural Variability: The Hot-Cold Concept of Medicine and Illness. *Human Organization*. 42(3):249-57.
- Weller SC. 1987. Shared Knowledge, Intracultural Variation and Knowledge Aggregation. *American Behavioral Scientist*. 31(2):178-93.
- Weller SC. 1998. Structured Interviewing and Questionnaire Construction. In: Handbook of Methods in Cultural Anthropology. H.R. Bernard editor. AltaMira Press, Walnut Creek CA. Pages 365-409.
- Weller SC, Dungy CI. 1986. Personal Preferences and Ethnic Variations among Anglo and Hispanic Breast and Bottle Feeders. *Social Science and Medicine*. 23(6):539-48.
- Weller SC, Pachter LM, Trotter III RT, Baer RD. 1993. Empacho in Four Latino Groups: A Study of Intra- and Inter-Cultural Variation in Beliefs. *Medical Anthropology*. 15:109-36.
- Weller SC, Romney AK. 1988. Systematic Data Collection. Sage Publications, Newbury Park CA.
- West H. 1997. Sorcery of Construction and Sorcery of Ruin: Power and Ambivalence on the Mueda plateau, Mozambique (1882-1994). UMI, Ann Arbor, Michigan.
- Wexler KN, Romney AK. 1972. Individual Variations in Cognitive Structures. In: Multidimensional Scaling, Vol. II. Romney, Shepard and Nerlove eds. Seminar Press, New York. Pages 73-92.
- Williams AW. 1941. The Blood Pressure of Africans. *East African Medical Journal*. 18:109.
- Wilson TW, Hillfield LR, Grim CE. 1991. Systolic Blood Pressure Levels in Black Populations in sub-Saharan Africa, the West Indies, and the United States: A Meta-Analysis. *Hypertension*. 18(suppl 1):I87-I91.
- Wilson TW, Grim CE. 1991. Biohistory of Slavery and Blood Pressure Differences in Blacks Today. *Hypertension*. 17(supplement 1):I122-I128.

- World Health Organization - International Society of Hypertension Guidelines for the Management of Hypertension, Guidelines Subcommittee. 1999. *Journal of Hypertension*. 17:151-183.
- Yen IH, Syme SL. 1999. The Social Environment and Health: A Discussion of the Epidemiologic Literature. *Annual Review of Public Health*. 20:287-308.
- Yonga GO. 1998. Development of Risk Factors for Coronary Artery Disease in Africans. *East African Medical Journal*. 75(9):493-4.

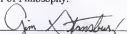
BIOGRAPHICAL SKETCH

Nanette Barkey received her Bachelor of Arts from Case Western Reserve University in Cleveland, Ohio, with a major in medical anthropology and a minor in nutrition. She served as a public health volunteer in Zaire and has worked on health projects in Angola, Haiti, Laos, Cote d'Ivoire, and Mozambique, as well as in the United States. She holds a Master of Science in Public Health (MSPH) from the University of South Florida.


I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


H. Russell Bernard, Chairman
Professor of Anthropology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


James P. Stansbury
Assistant Professor of Anthropology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Leslie Lieberman
Professor of Anthropology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Michael Chege
Associate Professor of Political Science

This dissertation was submitted to the Graduate Faculty of the Department of Anthropology in the College of Liberal Arts and Sciences and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December 2002

Dean, Graduate School

LD

1780

20 62

, B255

UNIVERSITY OF FLORIDA



3 1262 06556 6460